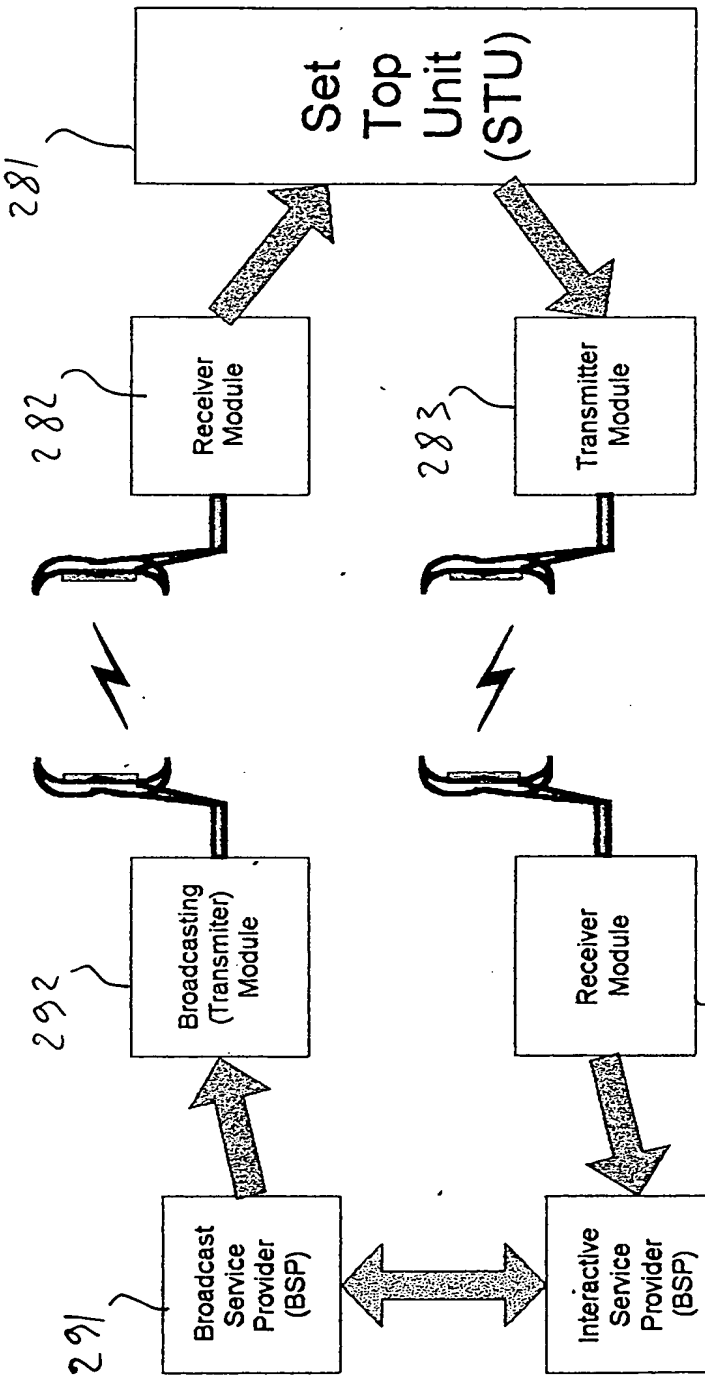
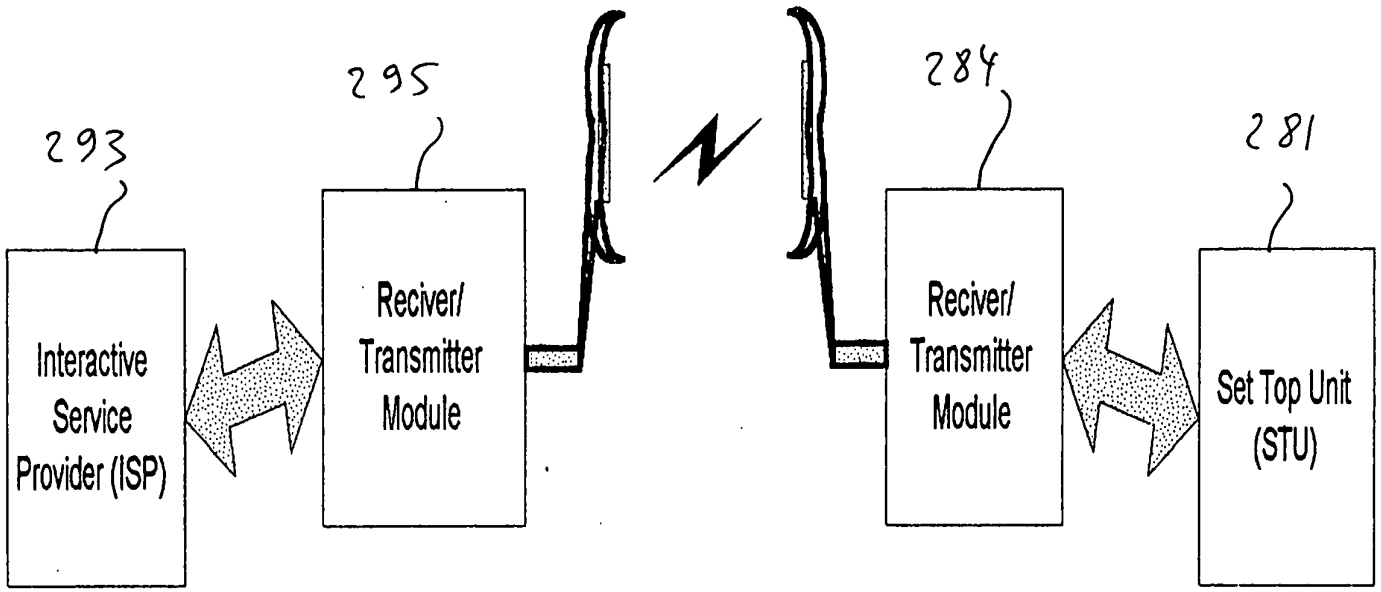


- DownLink - DVBT
- UpLink - OFDMA/TDMA

Fig. 1

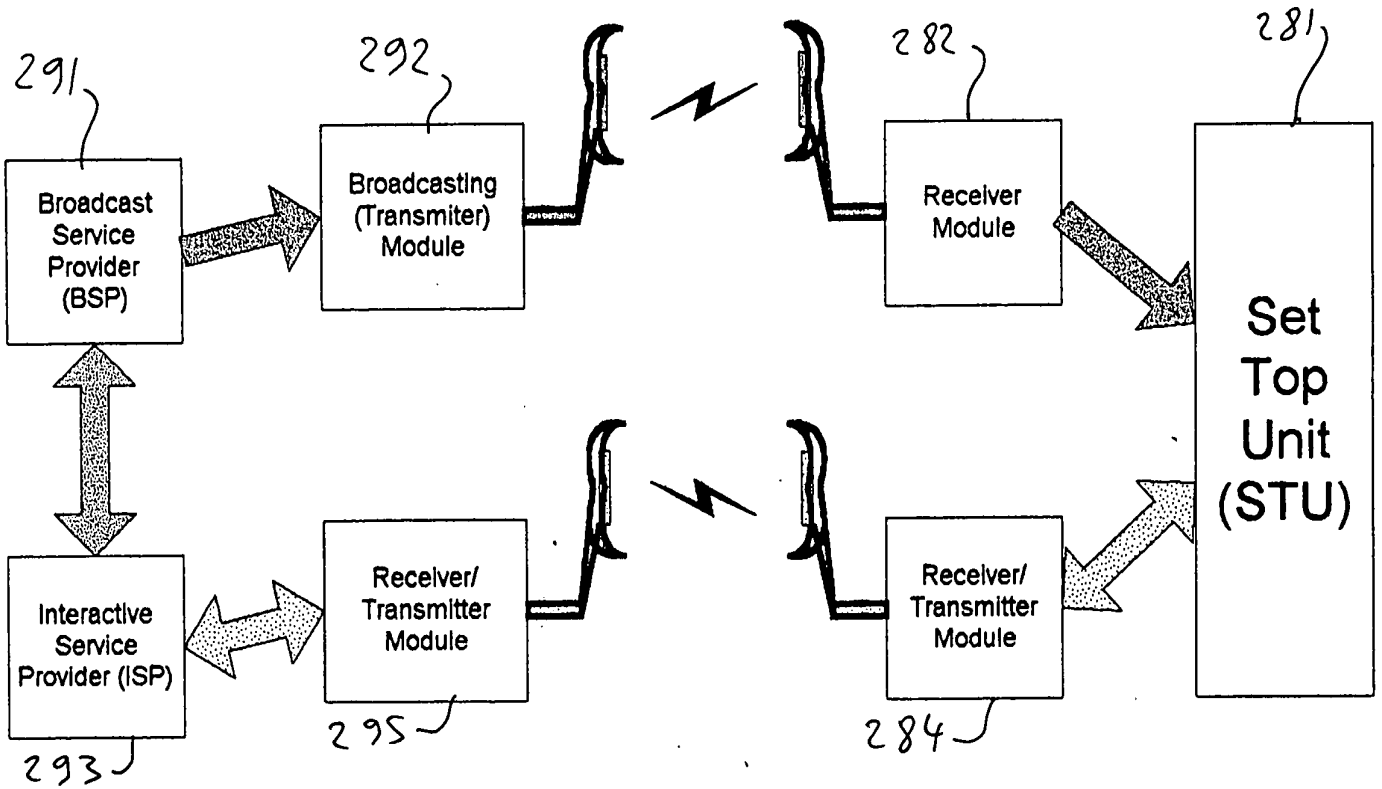
09624237 .0720400



- DownLink - DVBT
- UpLink - In Band OFDMA/TDMA

Fig. 2

00h20" 23h296D



- DownLink - DVBT, Out Of Band OFDM/TDM
- UpLink - OFDMA/TDMA

Fig. 3

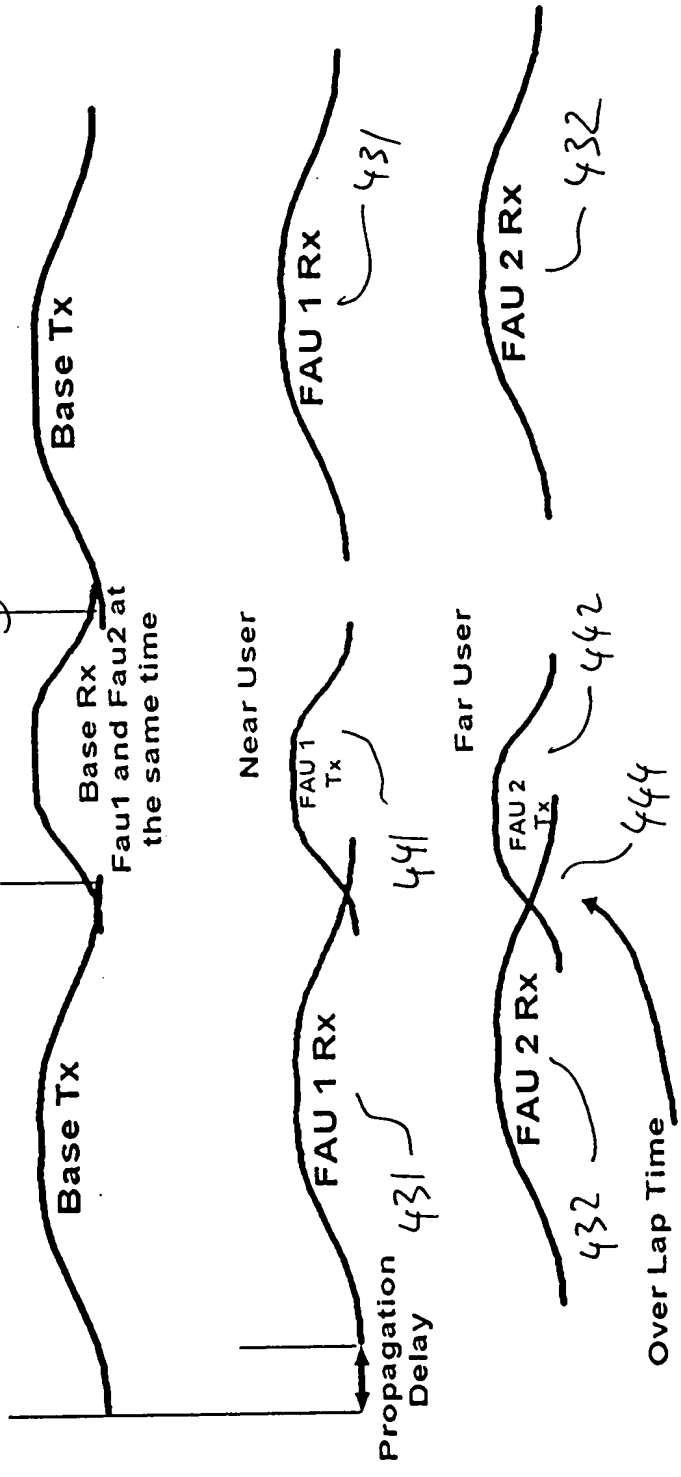

Base Tx
Guard Interval
443
Base Rx
Fau1 and Fau2 at
the same time
Base Tx
FAU 1 Rx
431
Propagation
Delay
Near User
FAU 1
Tx
441
FAU 1 Rx
431
FAU 2 Rx
432
Far User
FAU 2
Tx
442
444
FAU 2 Rx
432
Over Lap Time

Fig. 4

00h20' 7E2h2960

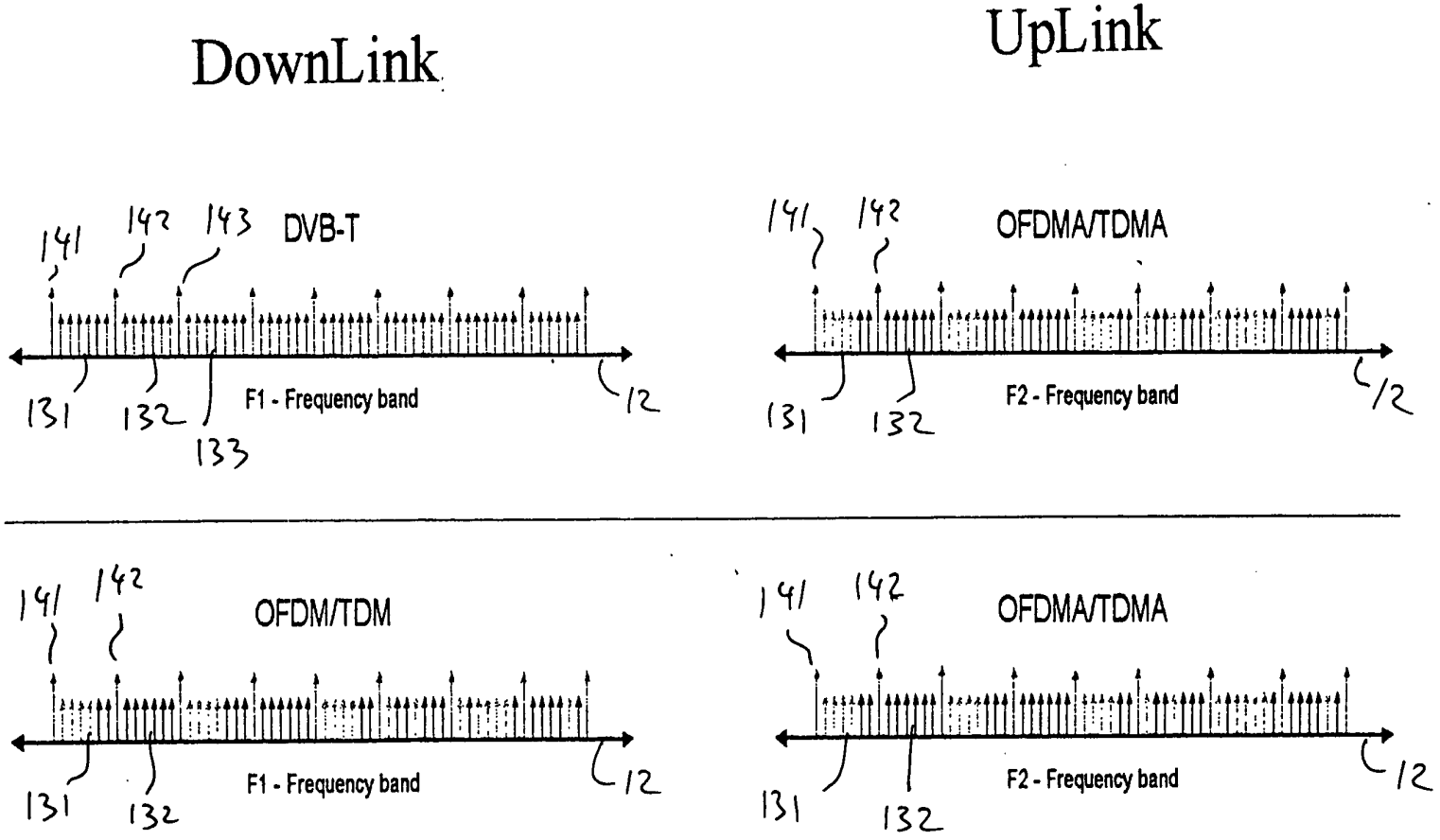


Fig. 5

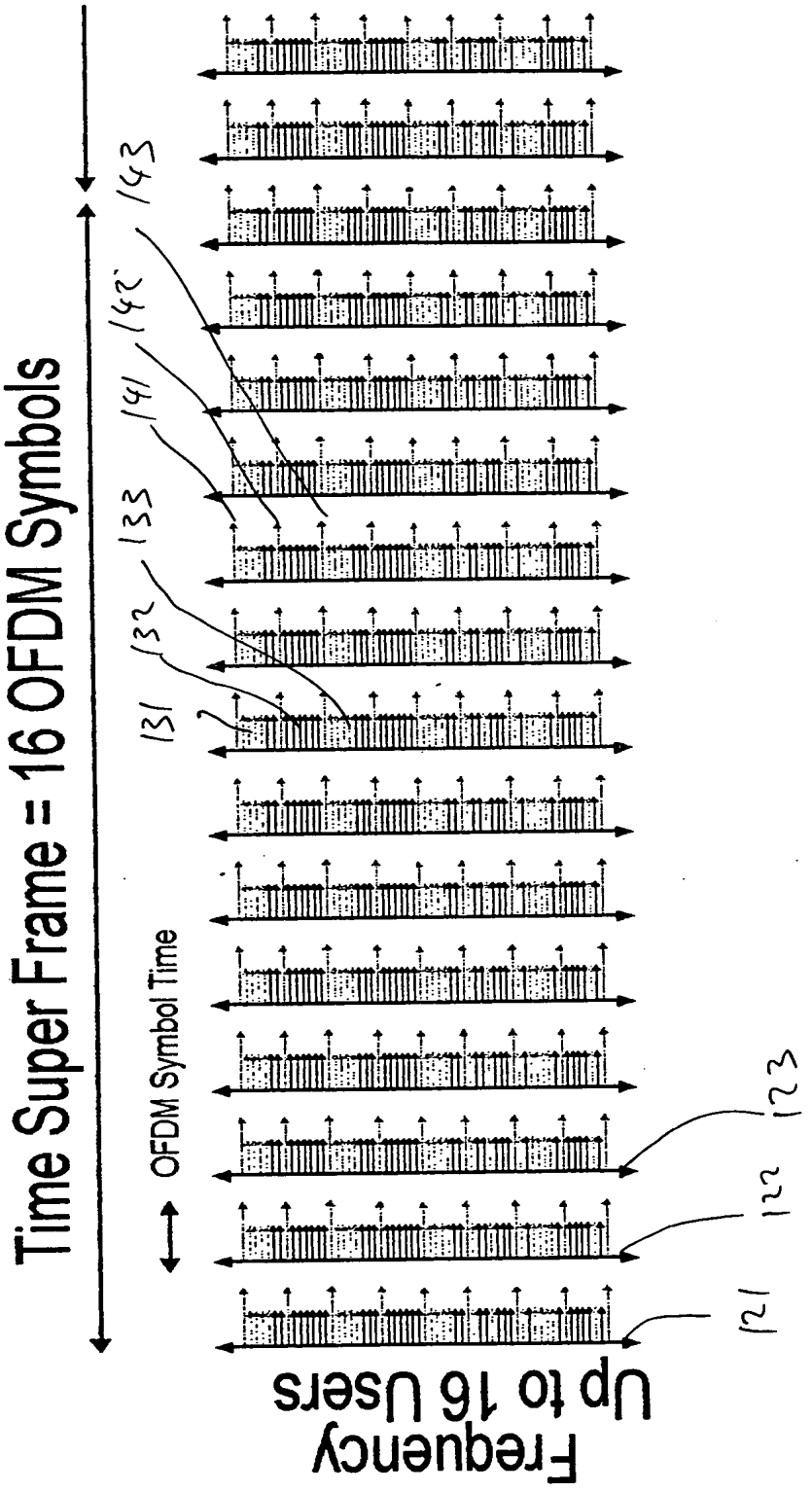

Time Super Frame = 16 OFDM Symbols
OFDM Symbol Time
Frequency
Up to 16 Users
143
142
141
133
132
131
123
122
121

Fig. 6

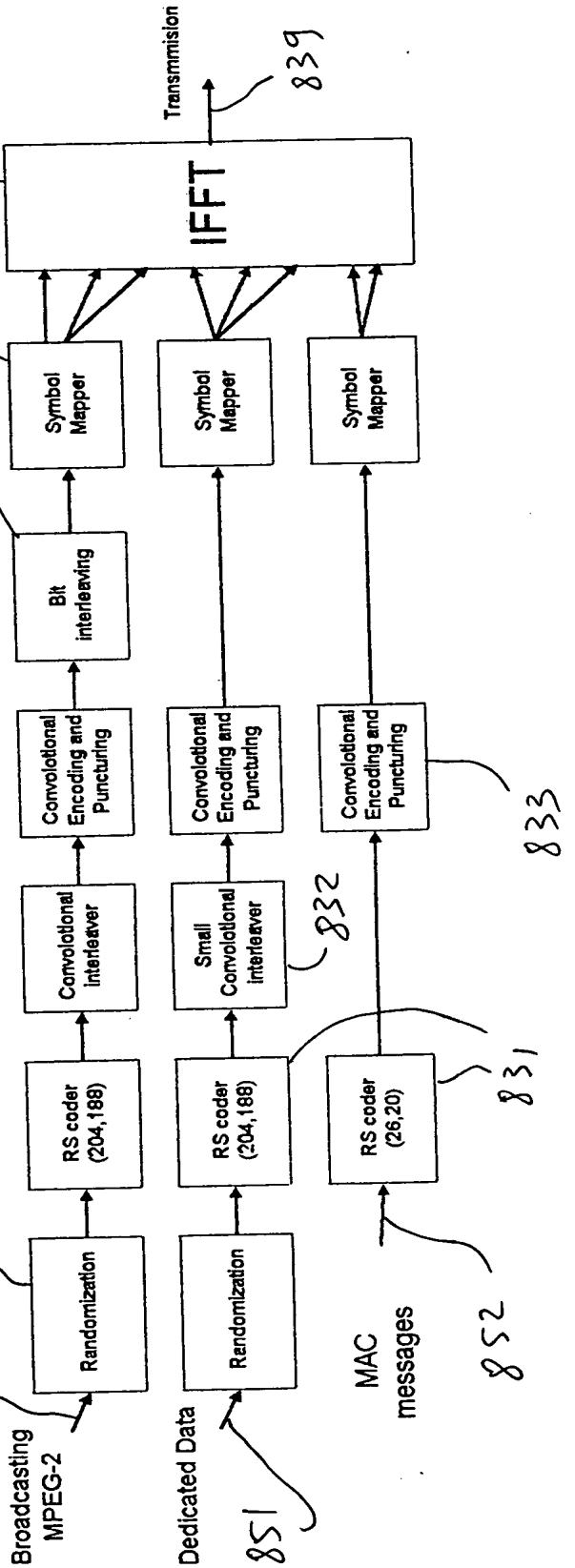

Down Stream Encoding and Modulation
850
830
Broadcasting MPEG-2
Randomization
RS coder (204,188)
Convolutional interleaver
Convolutional Encoding and Puncturing
Bit interleaving
Symbol Mapper
851
Dedicated Data
Randomization
RS coder (204,188)
Small Convolutional interleaver
832
Convolutional Encoding and Puncturing
Symbol Mapper
852
MAC messages
RS coder (26,20)
831
Convolutional Encoding and Puncturing
833
Symbol Mapper
834
835
IFFT
838
Transmission
839

Fig. 7

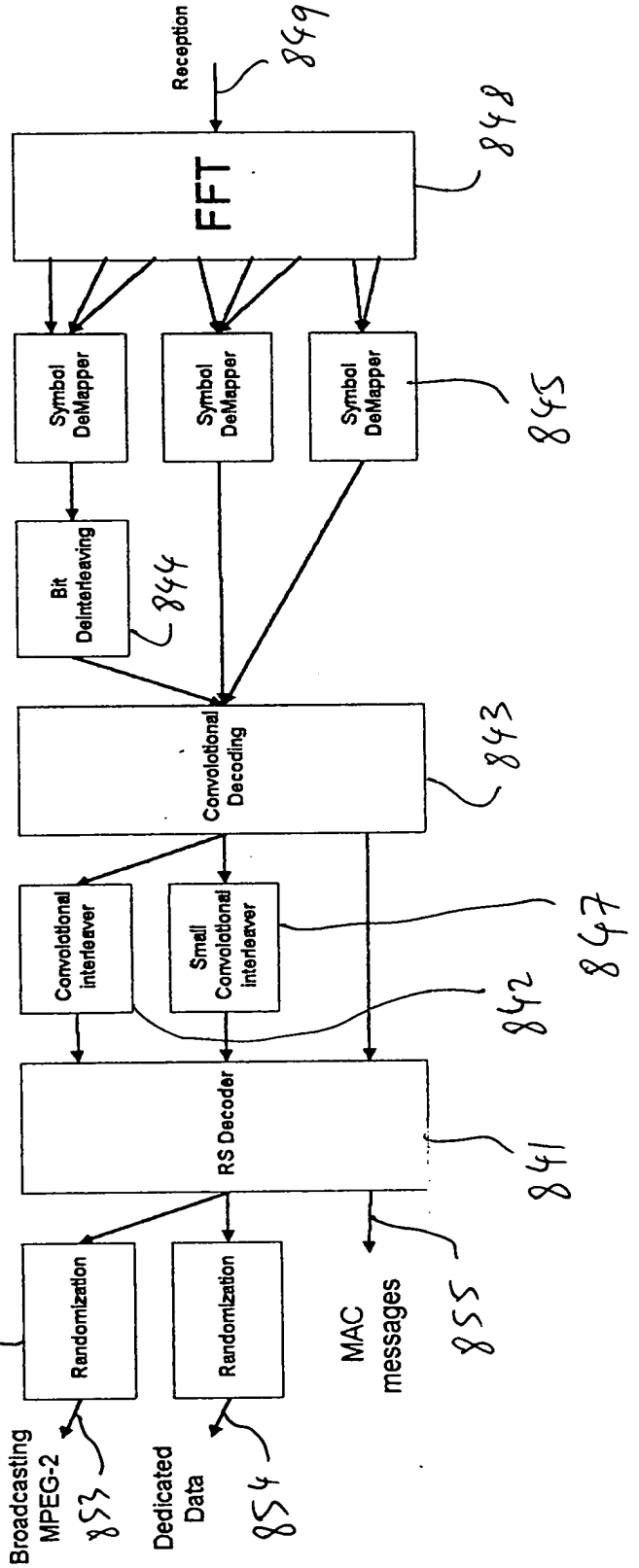

Down Stream Demodulation and Decoding
Reception
849
FFT
848
Symbol DeMapper
Symbol DeMapper
Symbol DeMapper
845
Bit DeInterleaving
844
Convolutional Decoding
843
Convolutional interleaver
Small Convolutional interleaver
847
842
RS Decoder
841
840
Randomization
Randomization
MAC messages
855
Broadcasting MPEG-2
853
Dedicated Data
854

Fig. 8

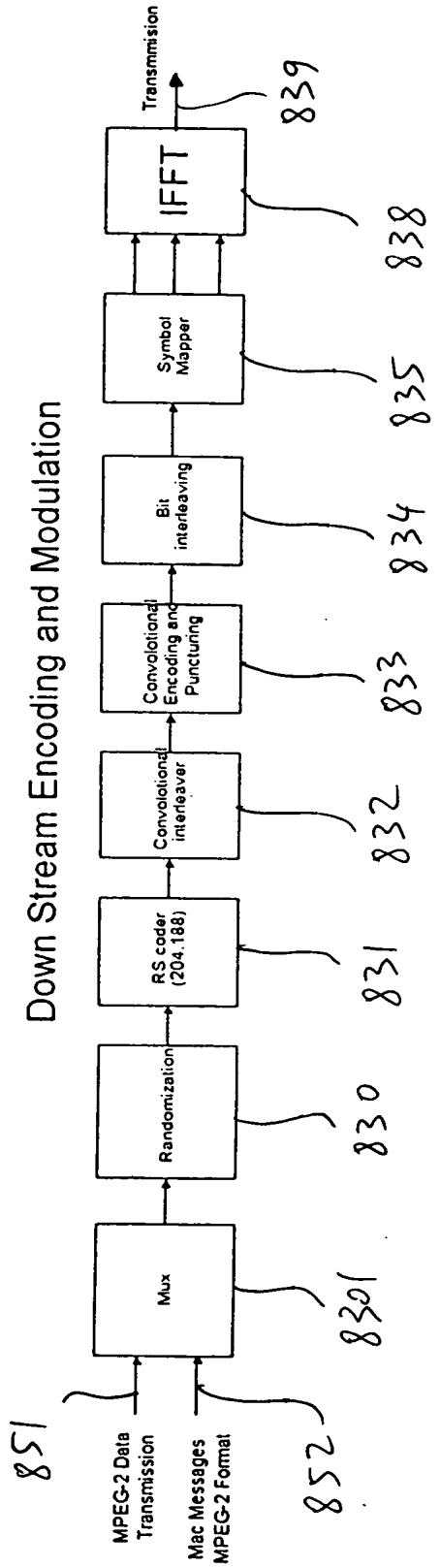

Down Stream Encoding and Modulation
MPEG-2 Data Transmission
Mac Messages MPEG-2 Format
Mux
Randomization
RS coder (204.188)
Convolutional interleaver
Convolutional Encoding and Puncturing
Bit interleaving
Symbol Mapper
IFFT
Transmission
851
852
8301
830
831
832
833
834
835
838
839

Fig. 9

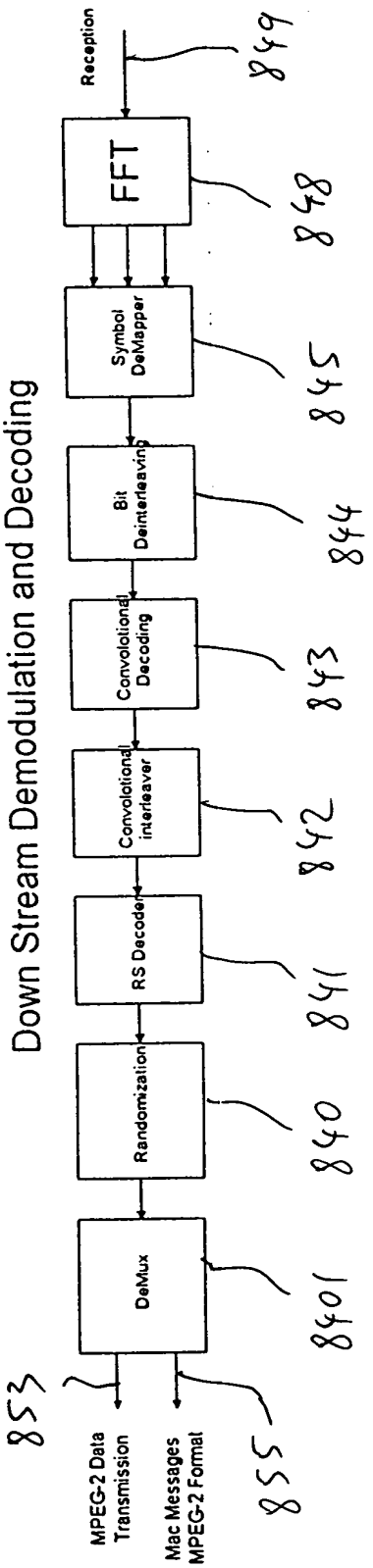

Down Stream Demodulation and Decoding
Reception
FFT
Symbol DeMapper
Bit Deinterleaving
Convolotional Decoding
Convolotional interleaver
RS Decoder
Randomization
DeMux
MPEG-2 Data Transmission
Mac Messages MPEG-2 Formal
849
848
845
844
843
842
841
840
8401
853
855

Fig. 10

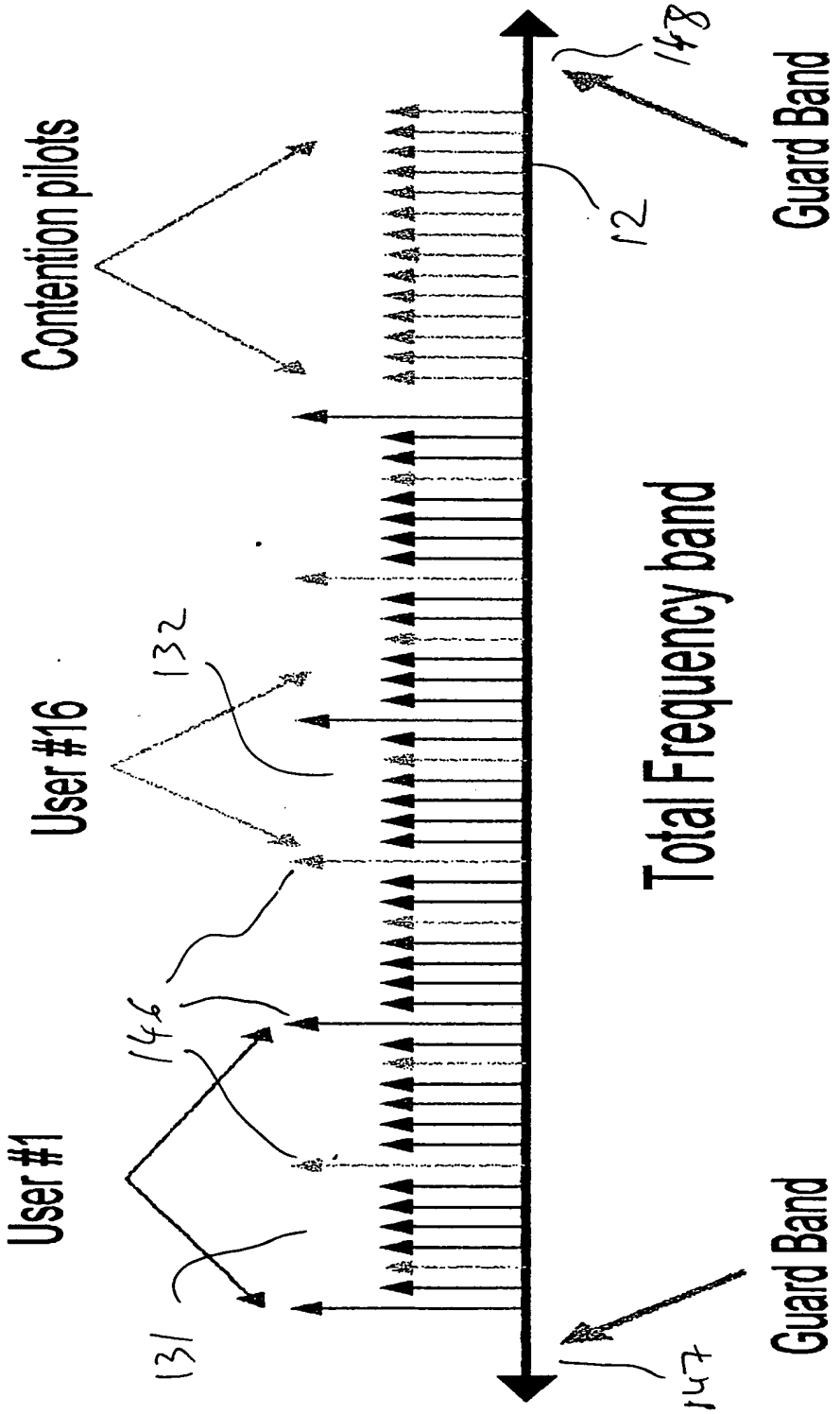

Contention pilots
User #16
132
User #1
146
131
Total Frequency band
12
148
Guard Band
147
Guard Band

Fig. 11

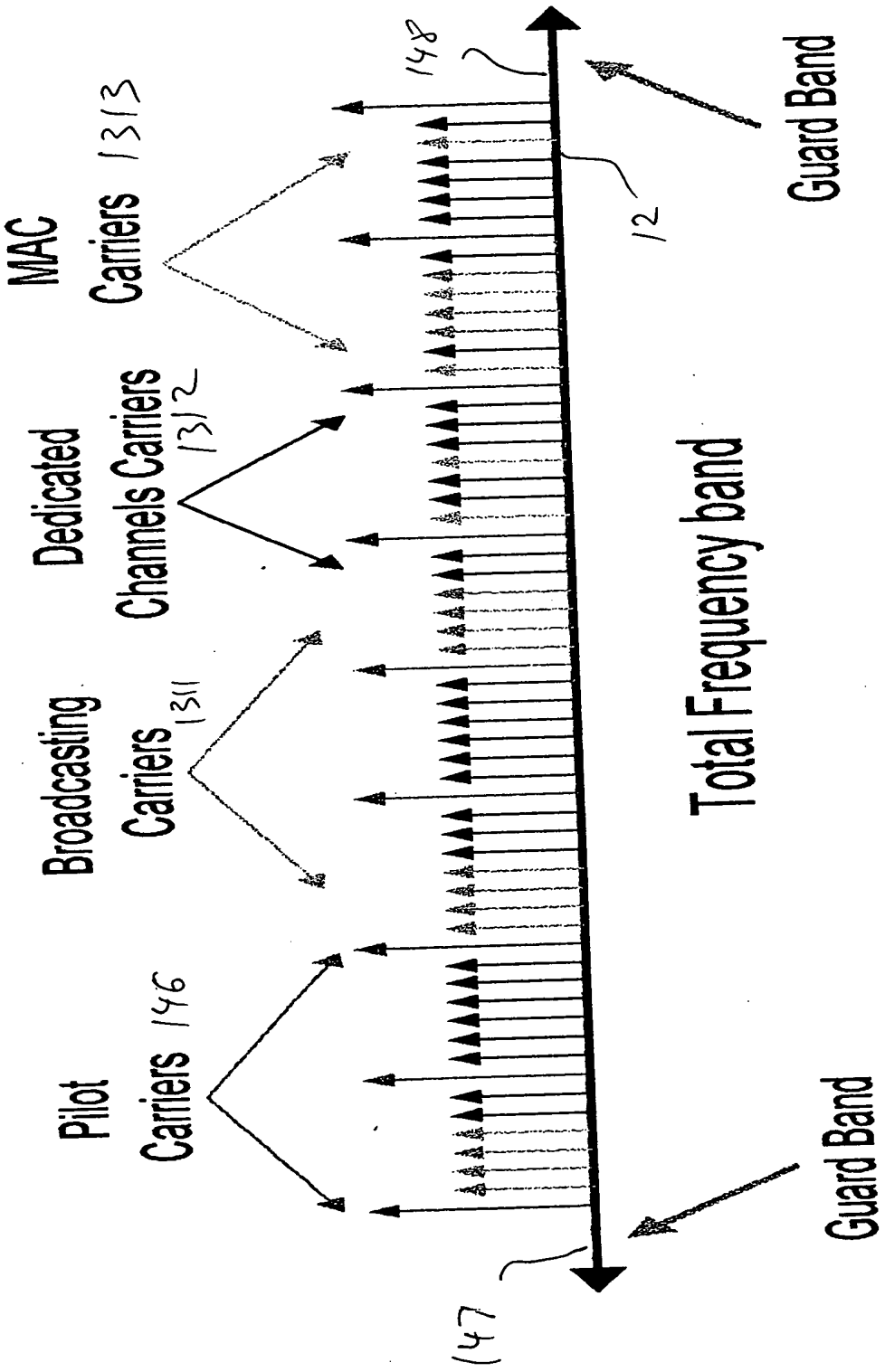

MAC
Carriers 1313
Dedicated
Channels Carriers
1312
Broadcasting
Carriers 1311
Pilot
Carriers 146
148
12
Guard Band
Total Frequency band
Guard Band
147

Fig. 12

Narrowband Interference Rejection

- User SubCarriers Blocks are Allocated by IFFT & FFT .
- Easy to Avoid/Reject Narrowband Dominant Interference .
- Less Interfered Part of the Carrier Can Still Be Used .

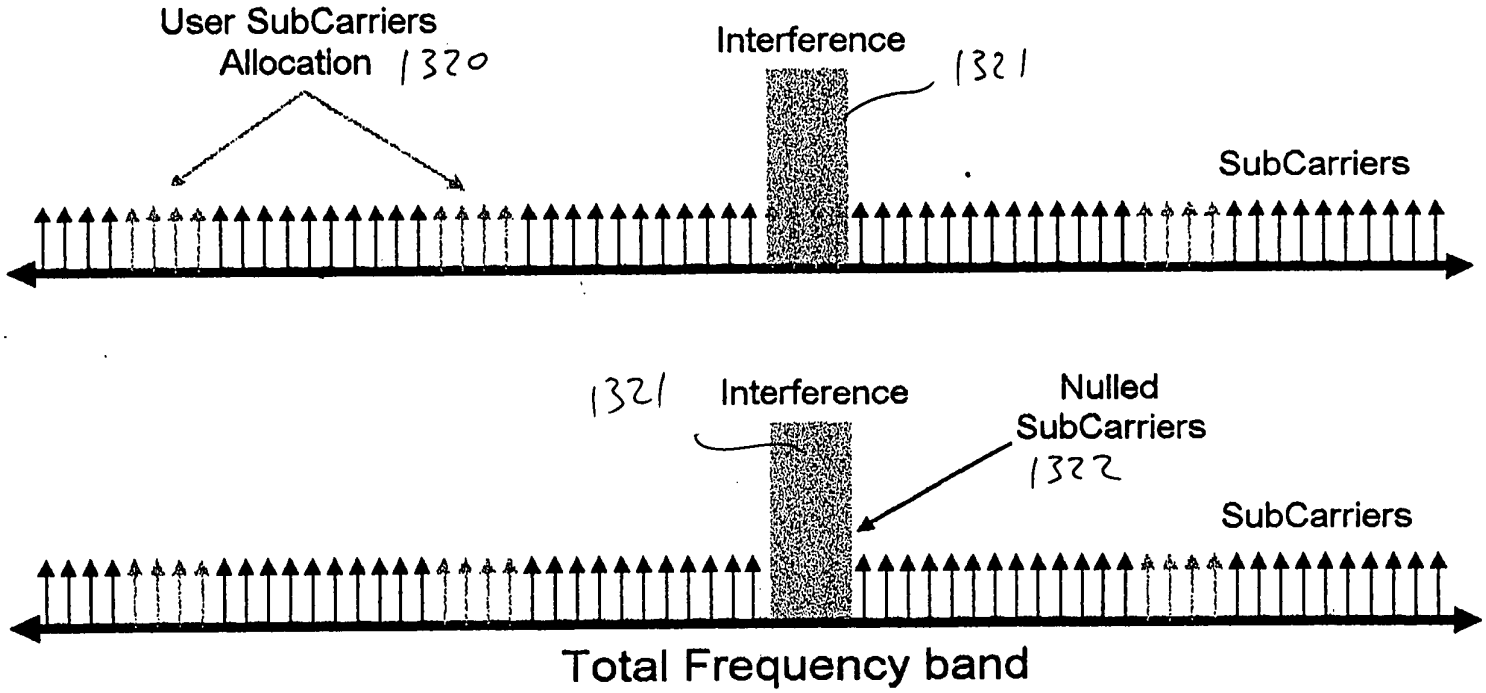


Fig. 13

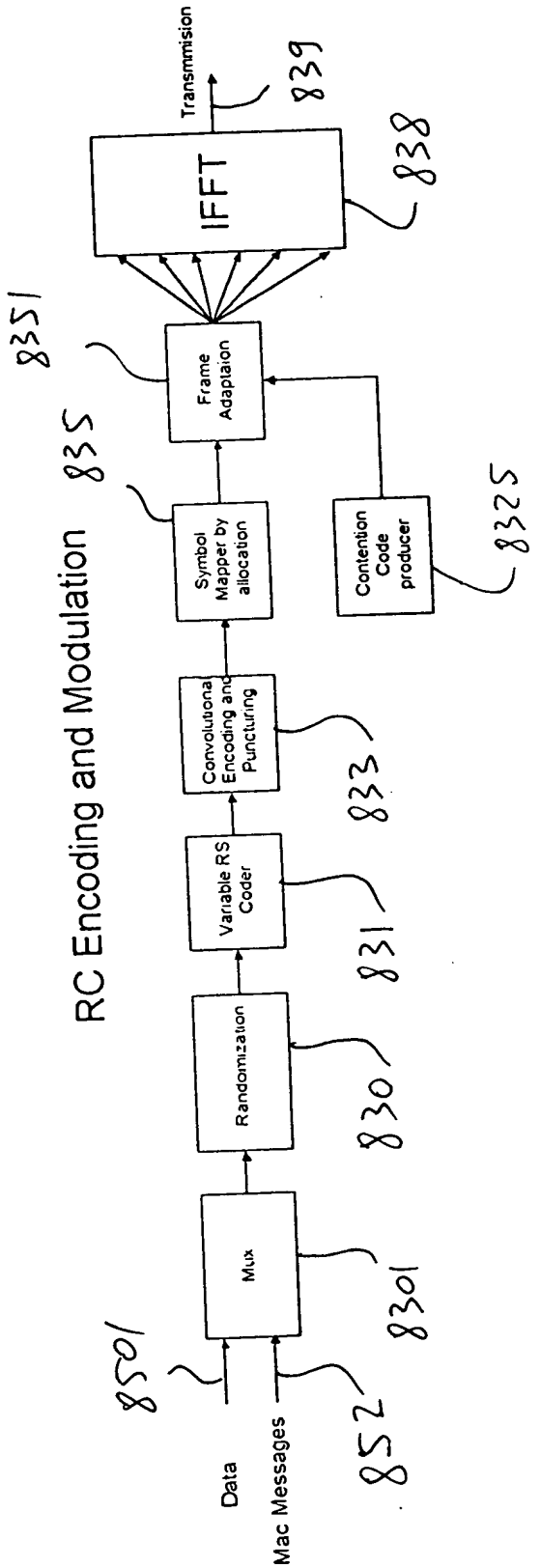

RC Encoding and Modulation
Data
Mac Messages
Mux
Randomization
Variable RS Coder
Convolutional Encoding and Puncturing
Symbol Mapper by allocation
Contention Code producer
Frame Adaptaion
IFFT
Transmmision
8501
8301
8302
8303
8305
8325
8351
8308
8309
8502

Fig. 14

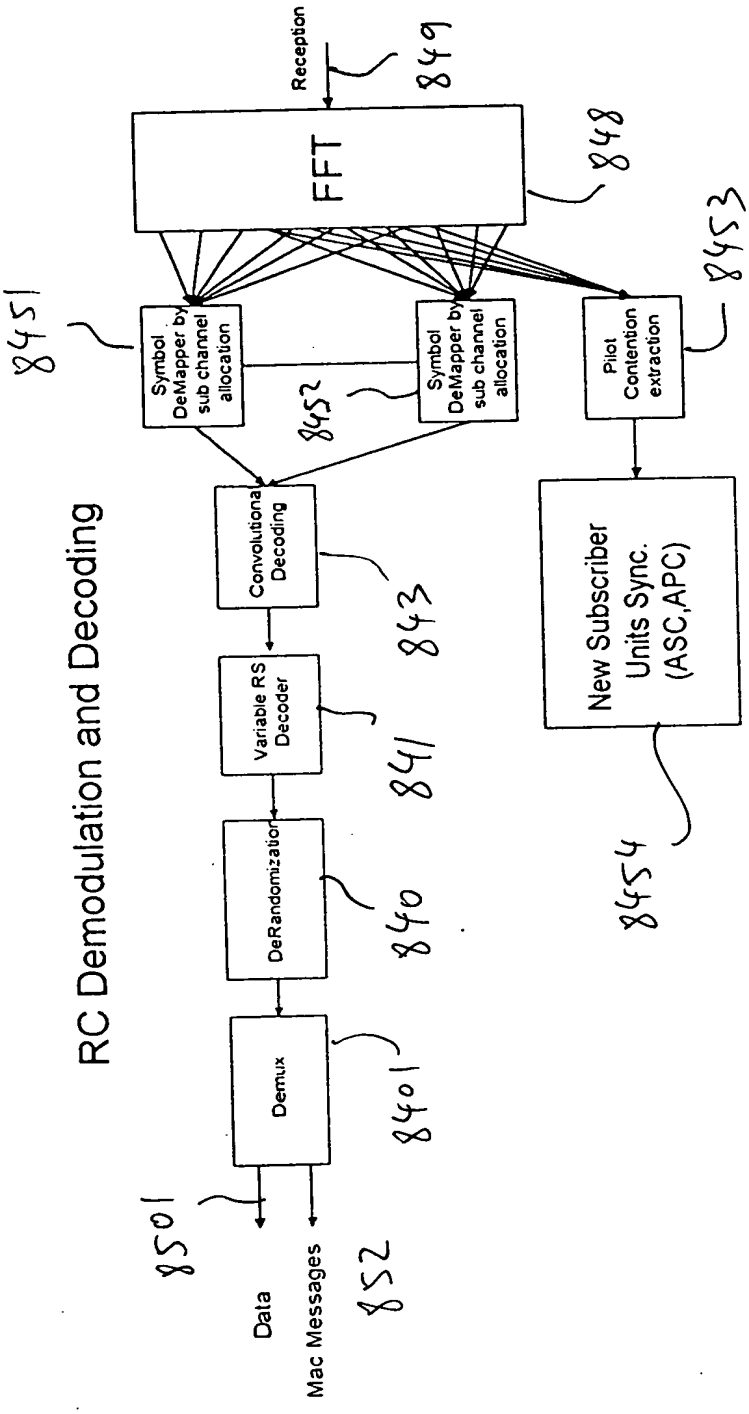
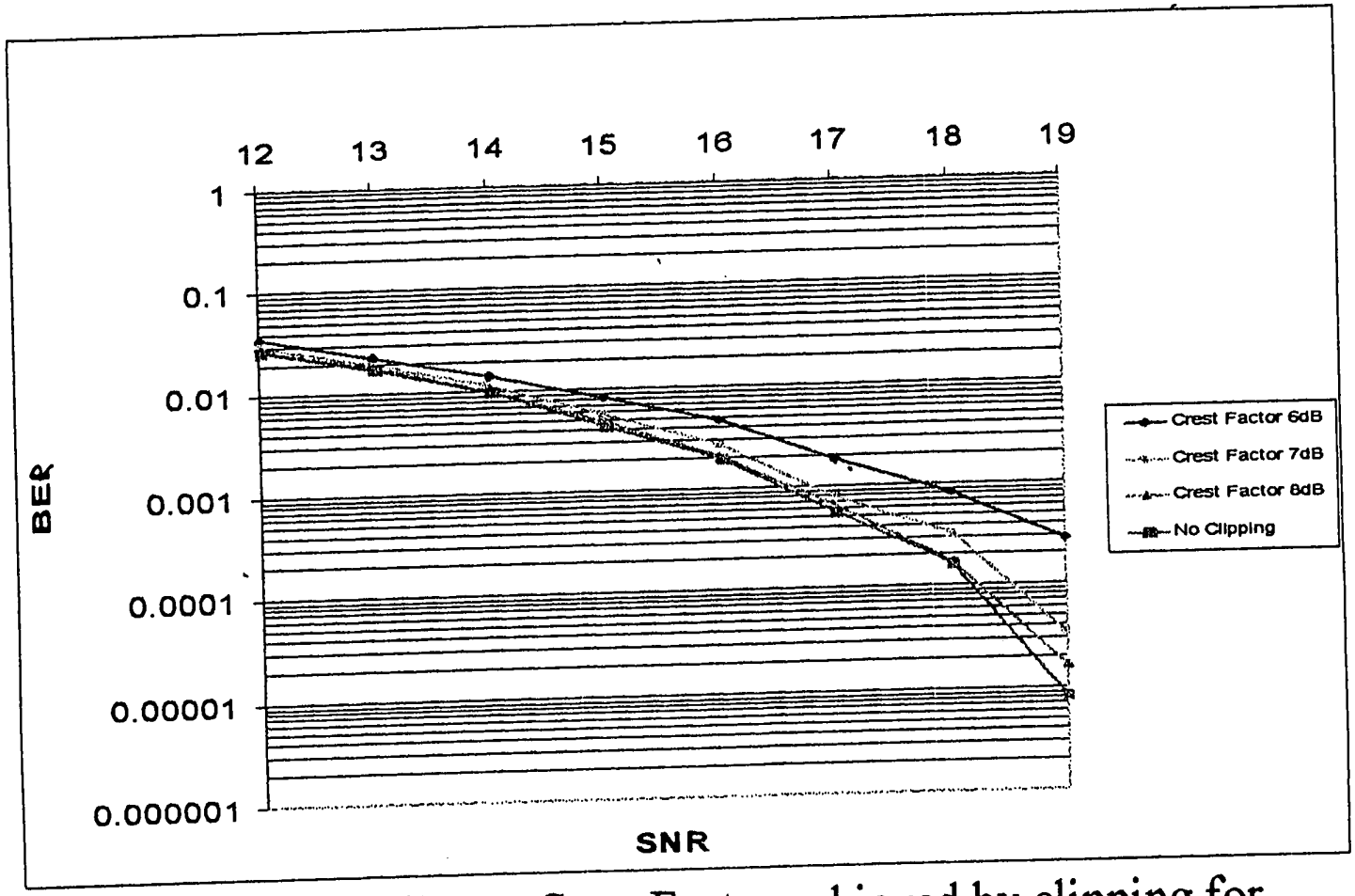
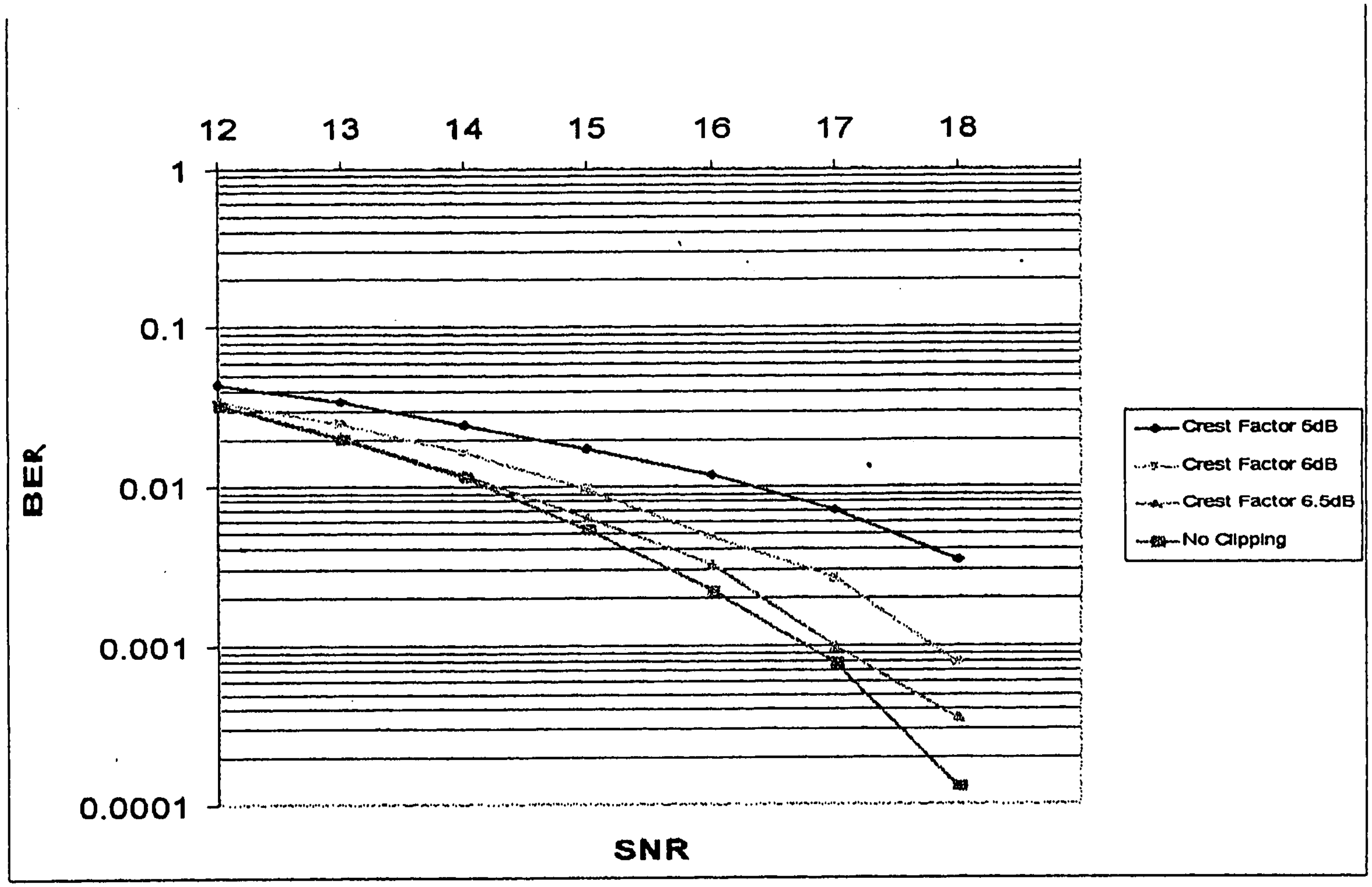

RC Demodulation and Decoding
Reception
849
FFT
848
8453
8451
Symbol DeMapper by sub channel allocation
8452
Symbol DeMapper by sub channel allocation
Pilot Contention extraction
Convolutional Decoding
843
Variable RS Decoder
841
DeRandomization
840
Demux
8401
New Subscriber Units Sync. (ASC,APC)
8454
8501
Data
852
Mac Messages

Fig. 15



BER/SNR for different Crest Factor achieved by clipping for a DVB-T 16QAM OFDM Symbol

Fig. 16



BER/SNR for different Crest Factor achieved by clipping for an Up Stream 16QAM OFDM Symbol

Fig. 17

09624237 .072400

- Rectangular Spectrum Shape (Brick Wall)
- Small Frequency Guard band

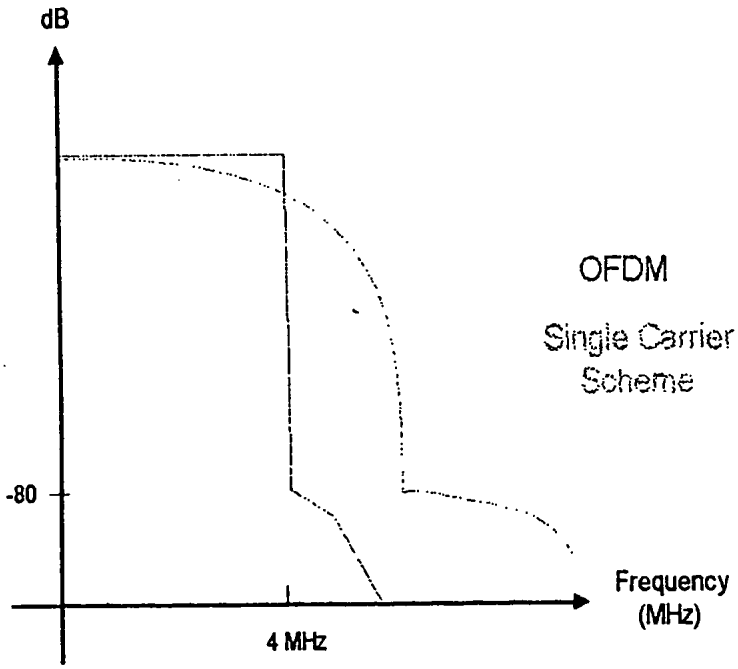


Fig. 18

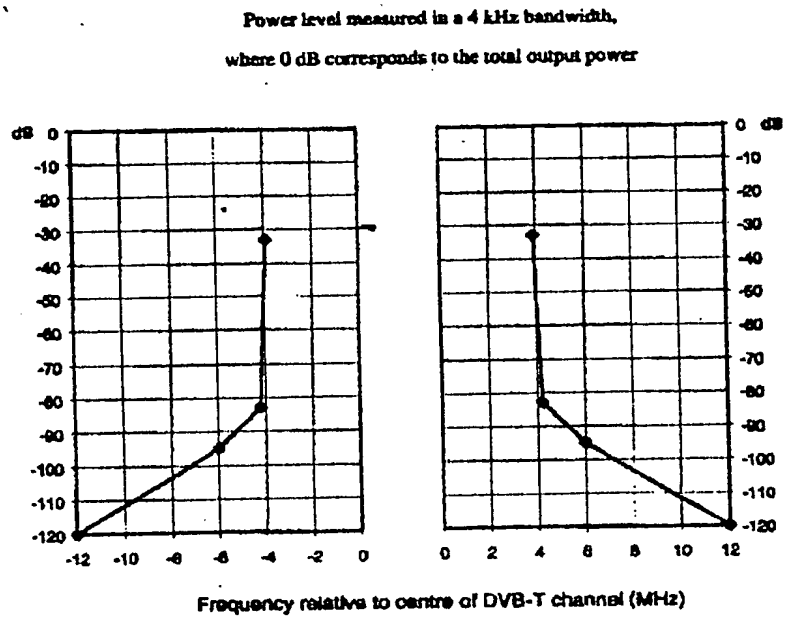
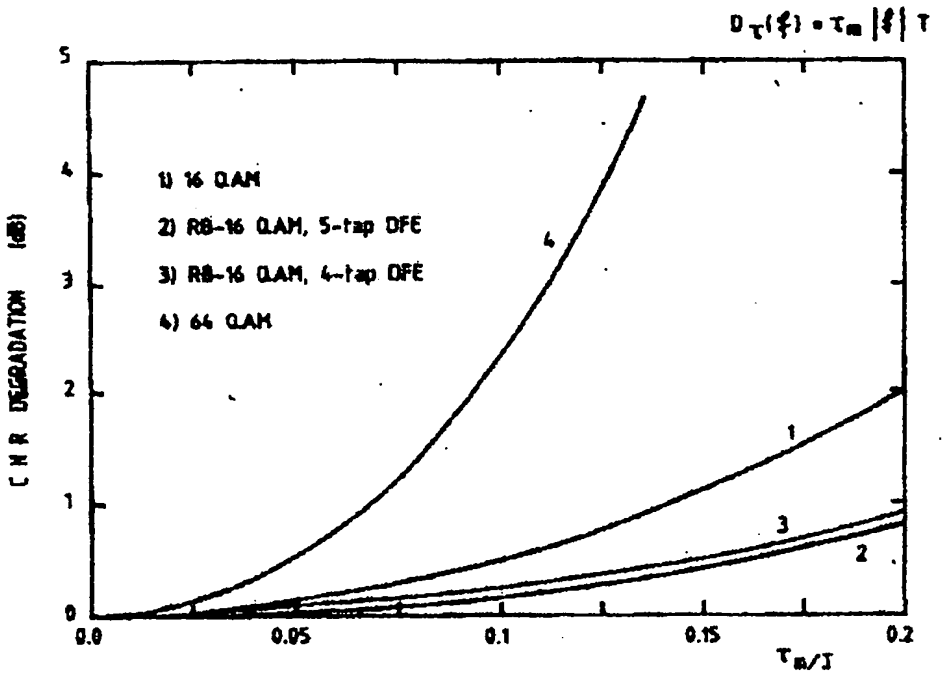
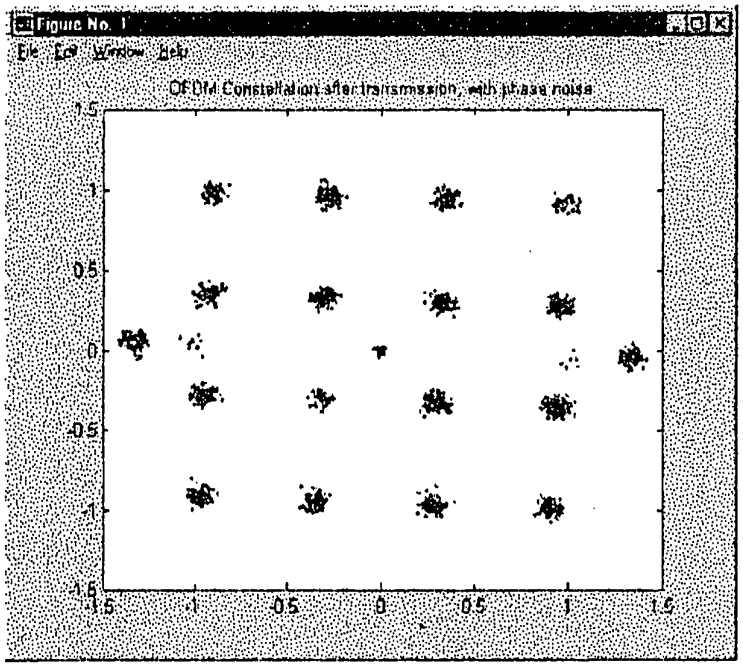

Power level measured in a 4 kHz bandwidth,
where 0 dB corresponds to the total output power
dB 0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-12 -10 -8 -6 -4 -2 0
0 dB
0 2 4 6 8 10 12
Frequency relative to centre of DVB-T channel (MHz)

Fig. 19

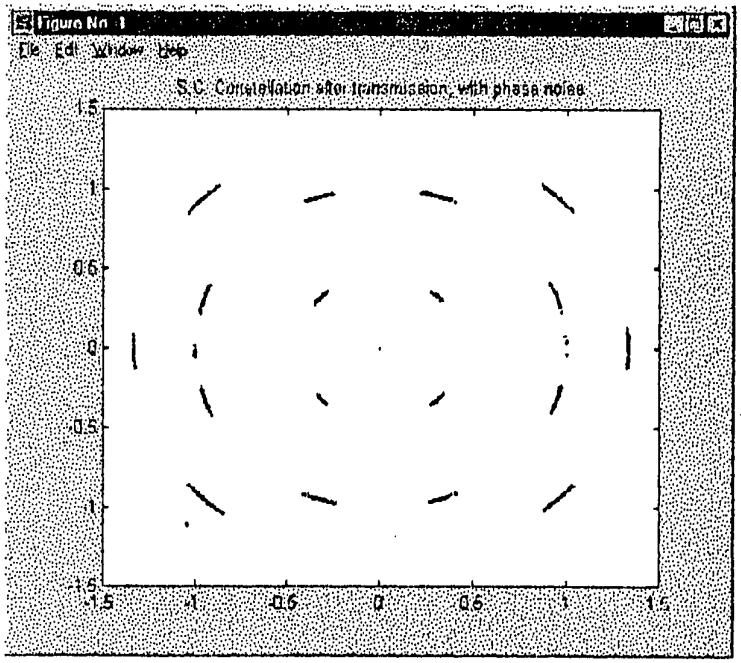


Influence of linear group-delay distortion on the performance of the three modulation schemes.

Fig. 20

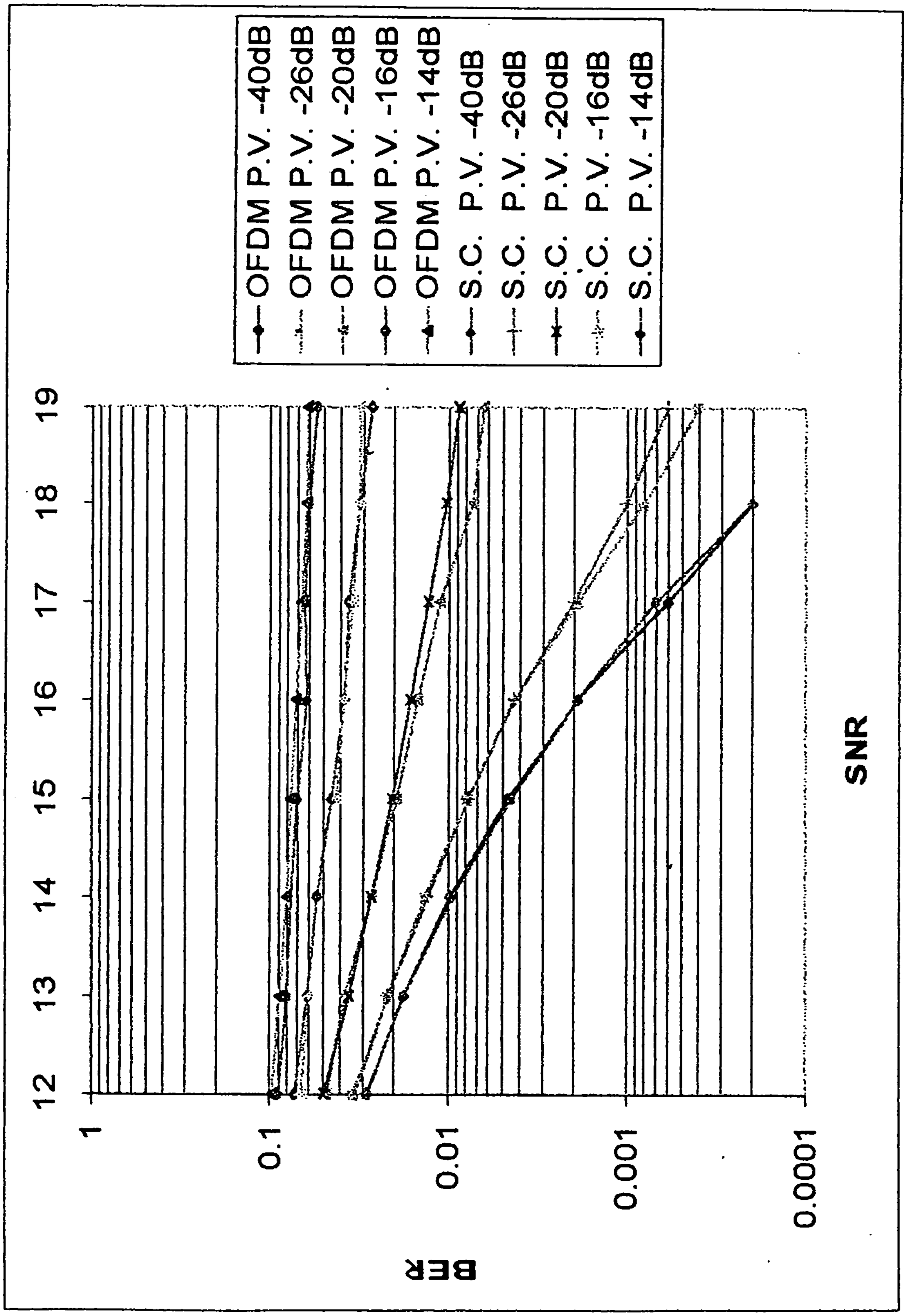


Phase Noise Effect on OFDM



Phase Noise Effect on S.C

Fig. 21



09624237 .072400

Fig. 22

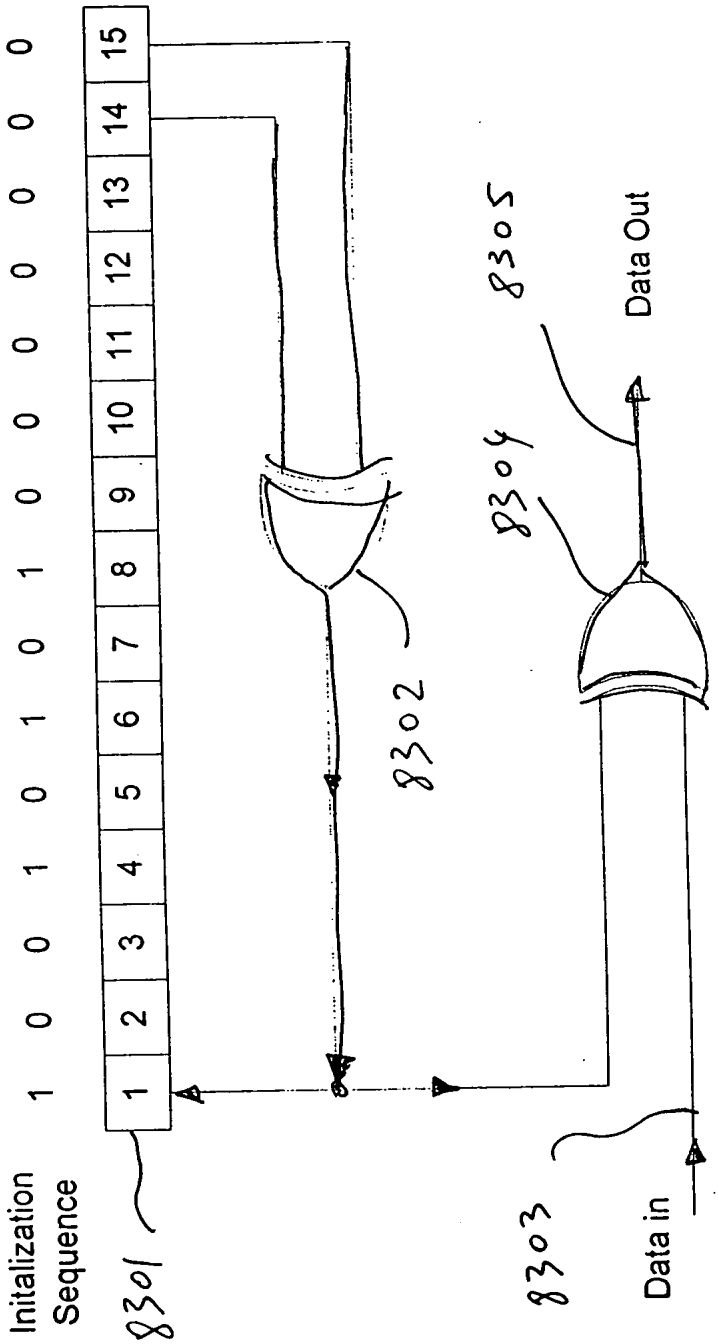

Initalization Sequence
1 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
8301
8302
8303
8304
8305
Data Out
Data in

Fig. 23

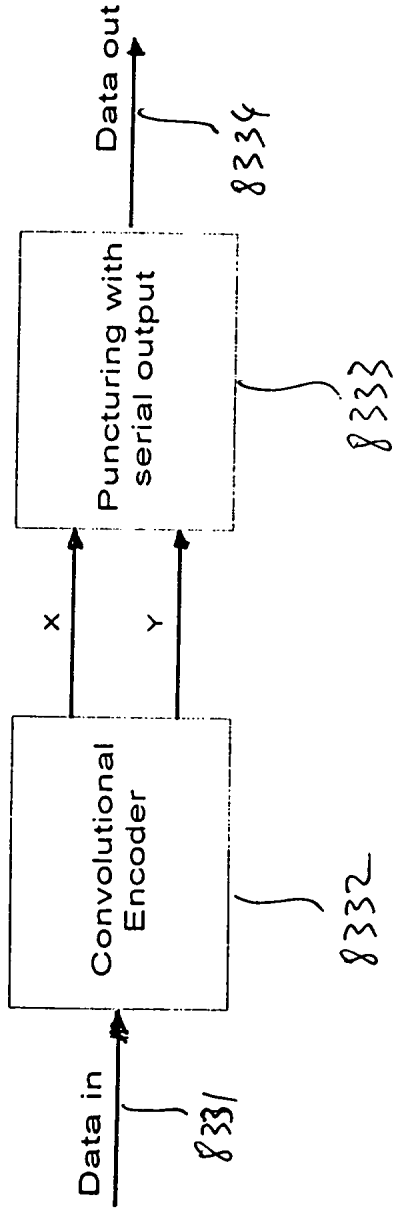

Data out
8334
Puncturing with serial output
8333
X
Y
Convolutional Encoder
8332
Data in
8331

Fig. 24

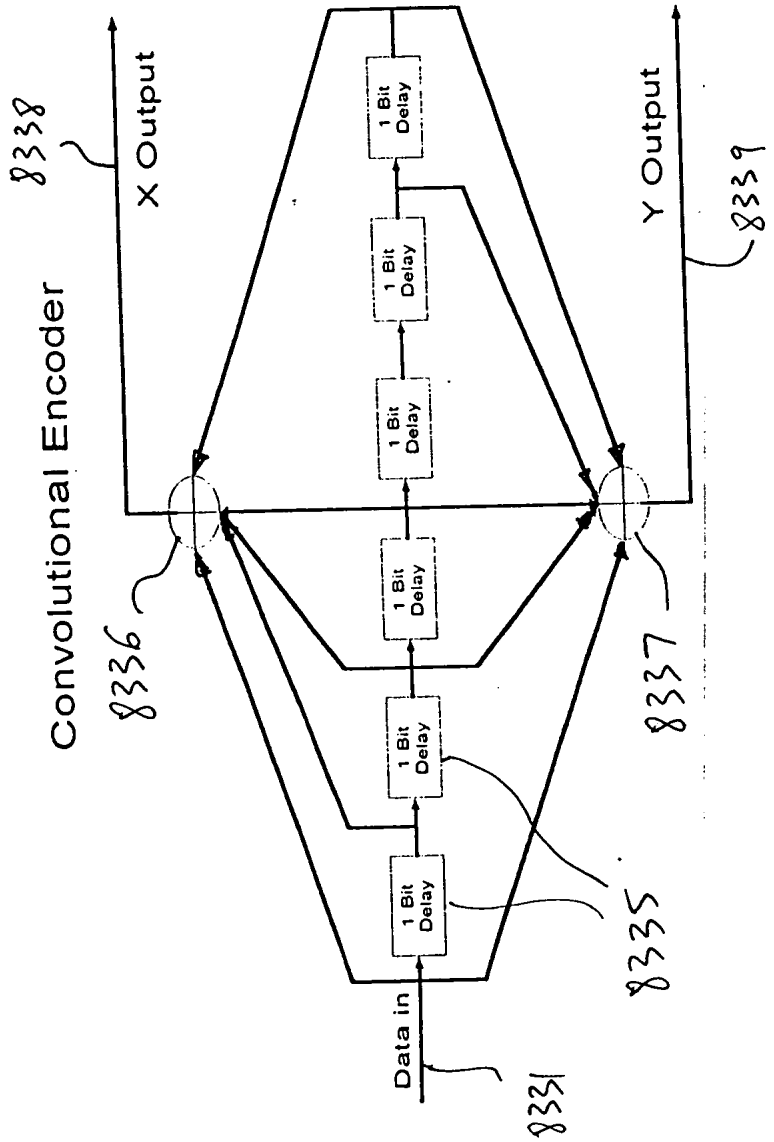

Convolutional Encoder
X Output
Y Output
Data in
1 Bit Delay
8331
8335
8336
8337
8338
8339

Fig. 25

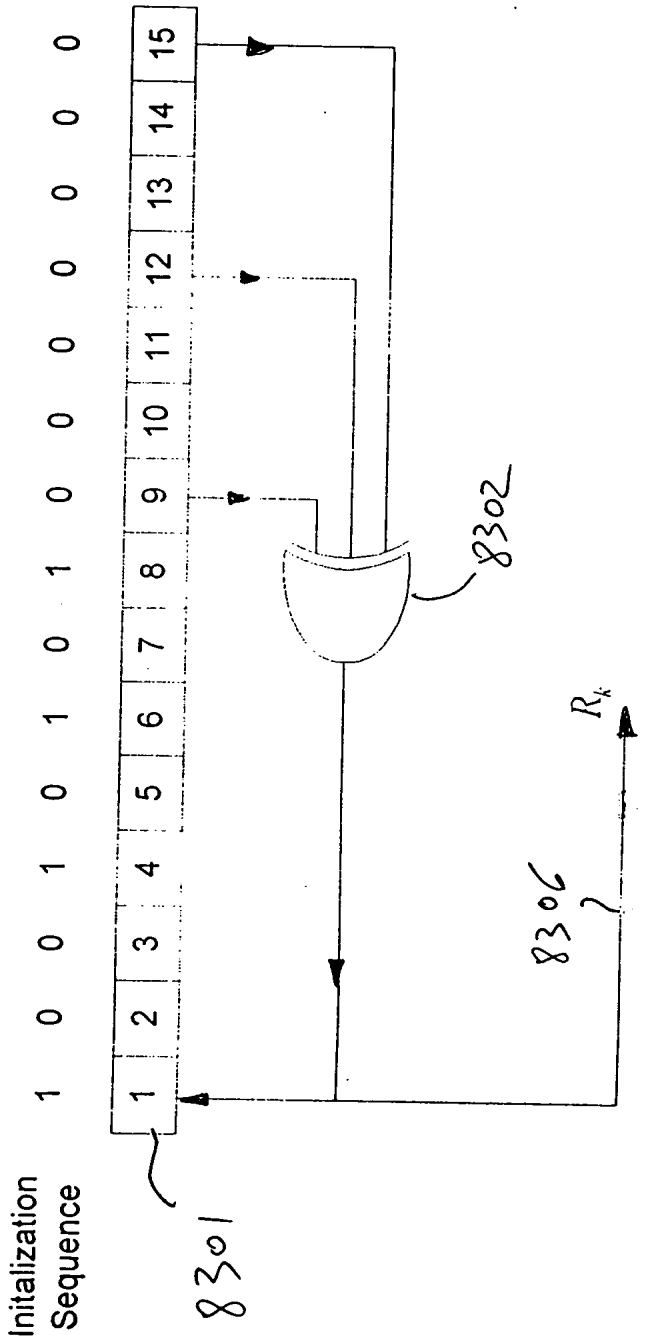

Initalization Sequence
1 0 0 0 1 0 1 0 1 0 1 0 0 0 0 0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
8301
8302
8306
R_k

Fig. 26

09624237 . 072400

QPSK

Bit ordering $X_0 X_1$

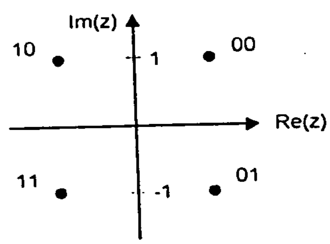


Fig. 27

16QAM

Bit ordering $X_0X_1X_2X_3$

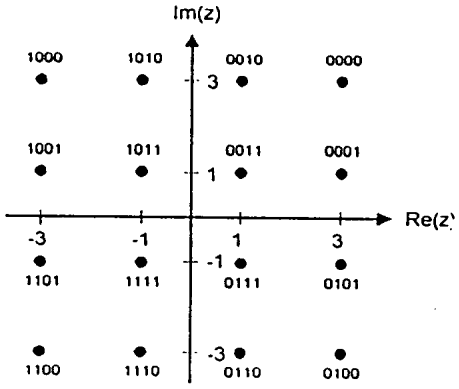


Fig. 28

64QAM

Bit ordering $X_0.X_1.X_2.X_3.X_4.X_5$

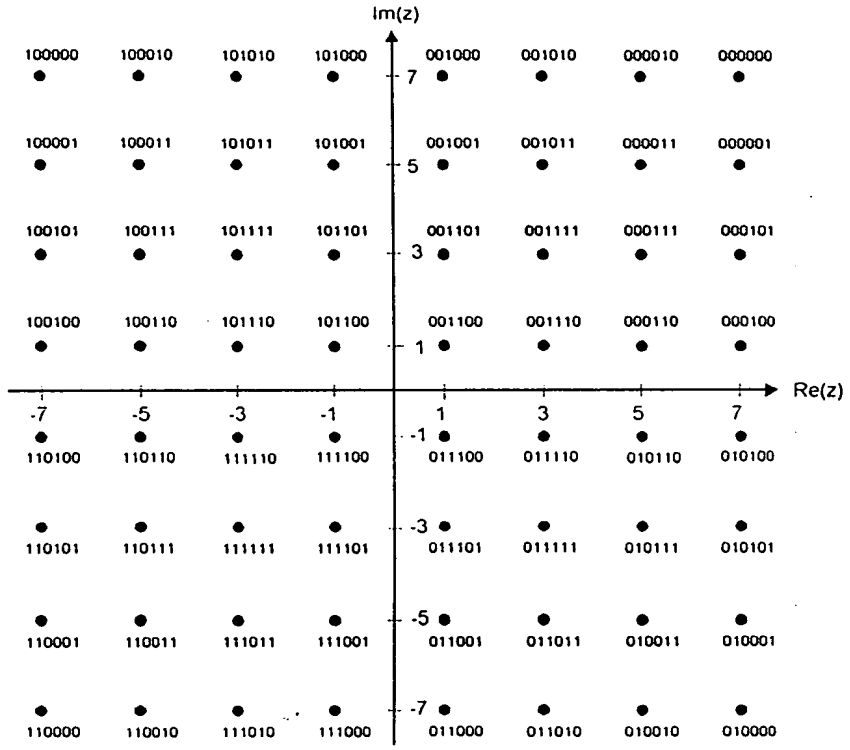


Fig. 29

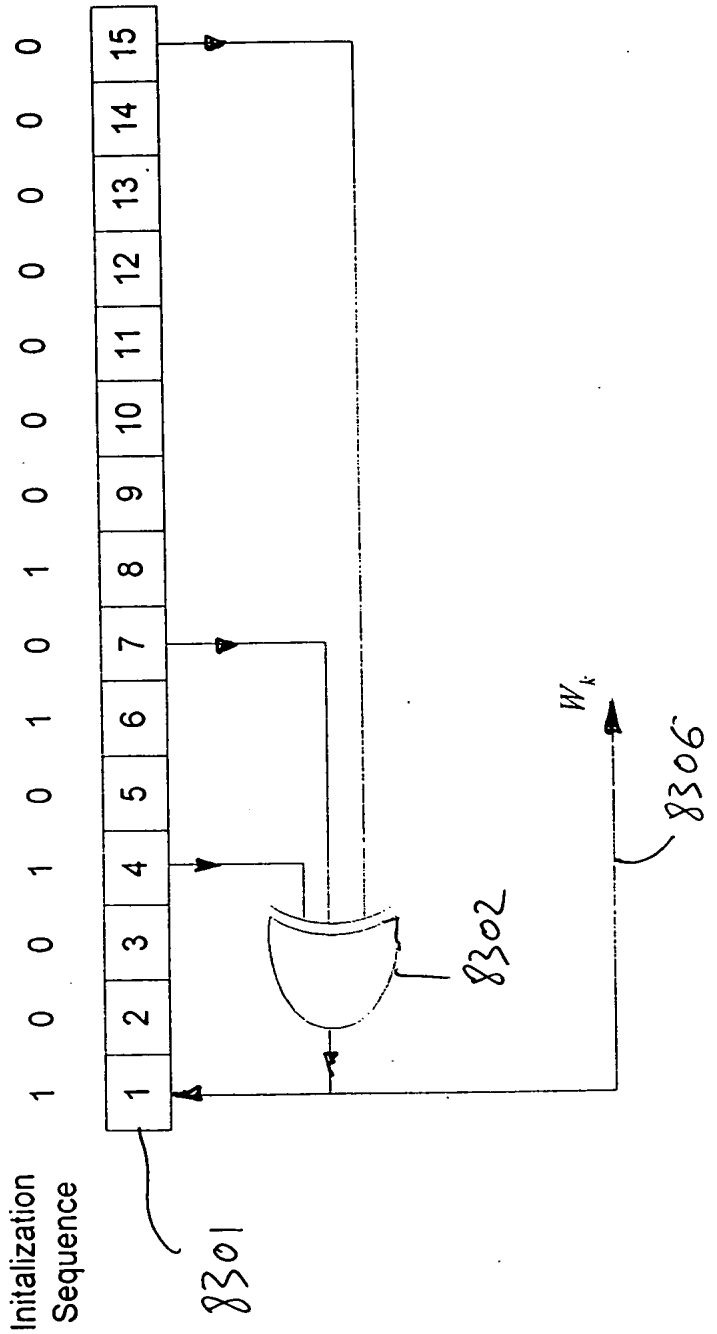

Initalization Sequence
1 0 0 0 1 0 1 0 0 0 0 0 0 0 0 0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
8301
8302
8306
W_k

Fig. 30

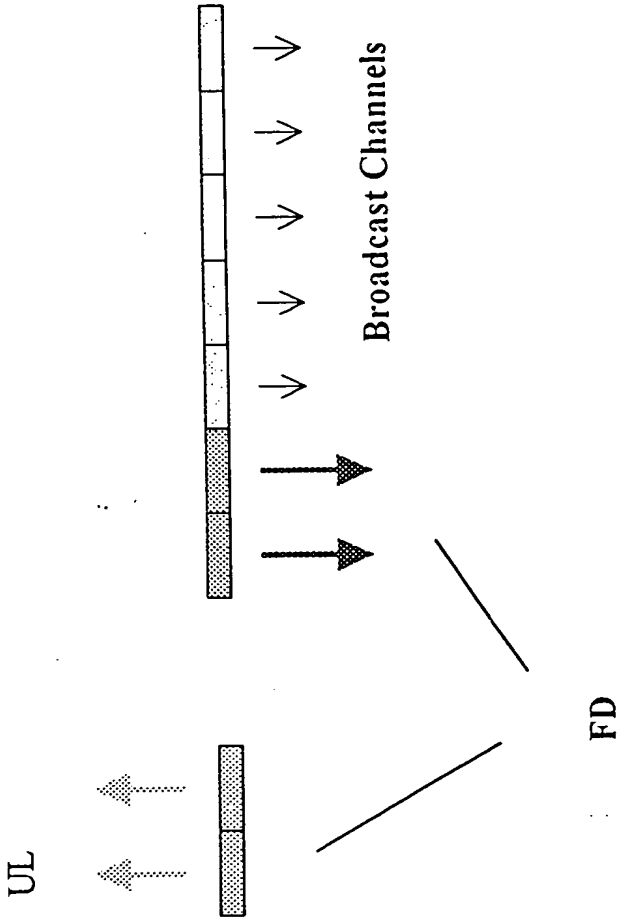


Fig. 31

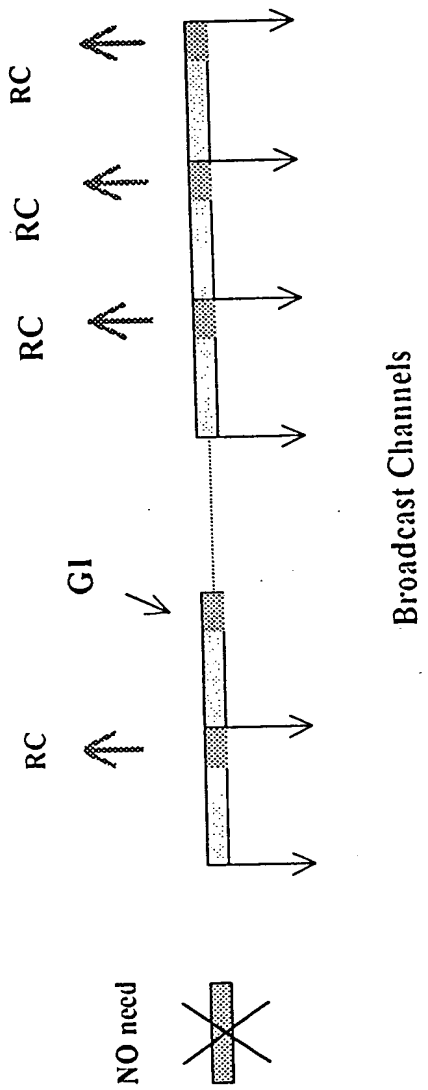


Fig. 32

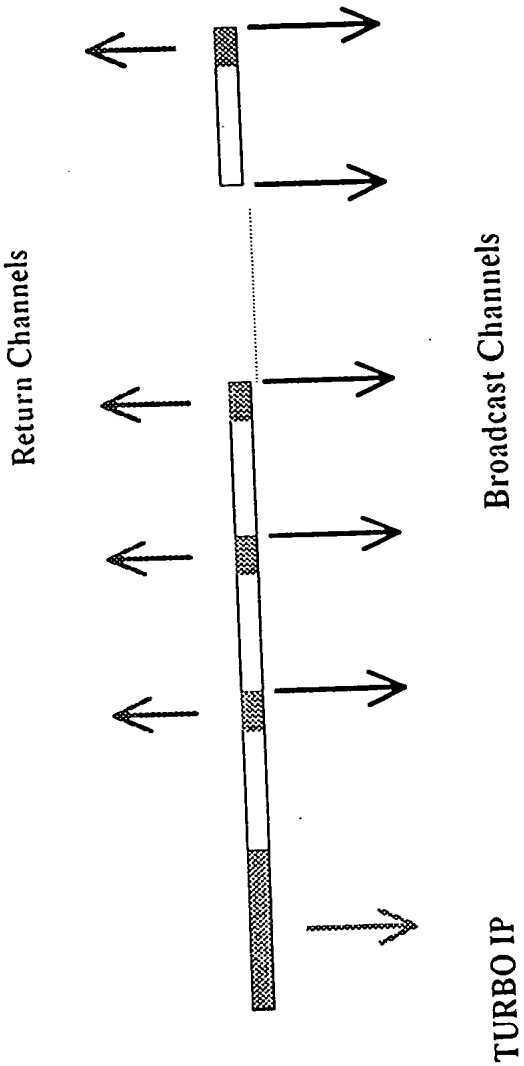


Fig. 33

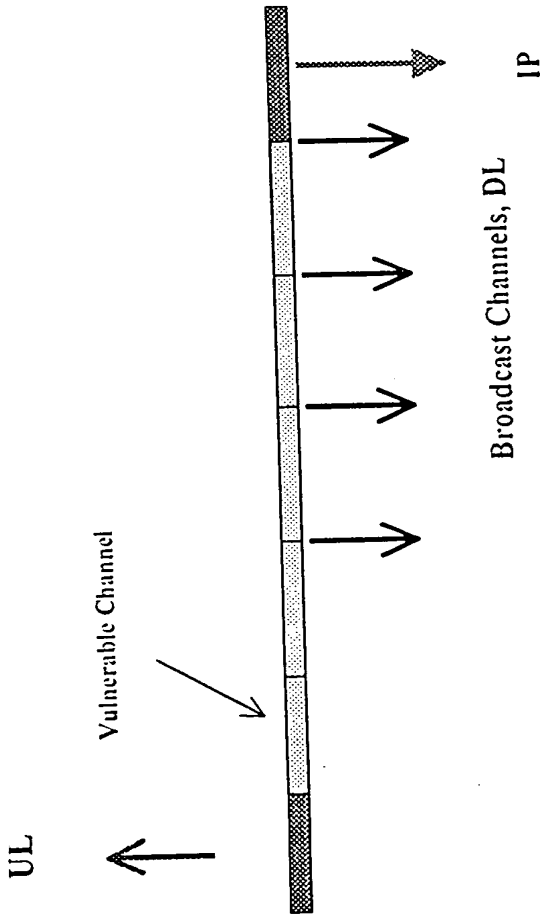


Fig. 34

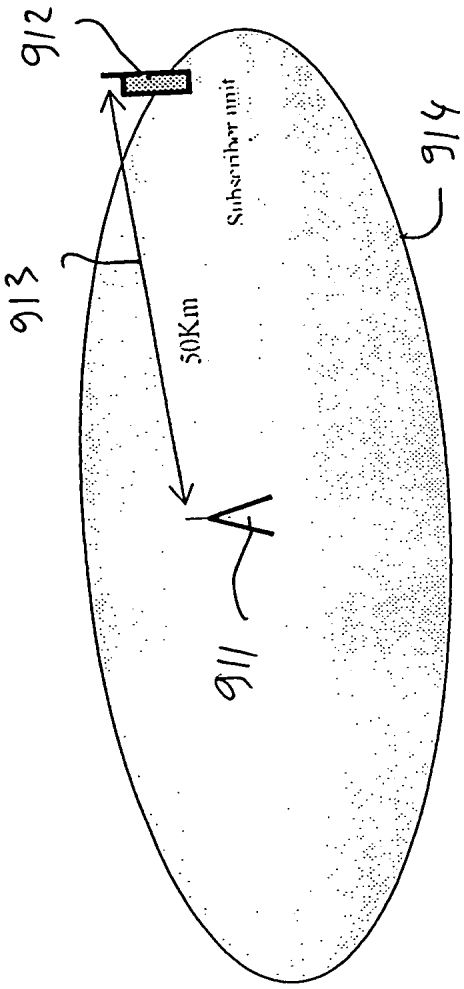


Fig. 35

09624297 - 072400

09624237.072400

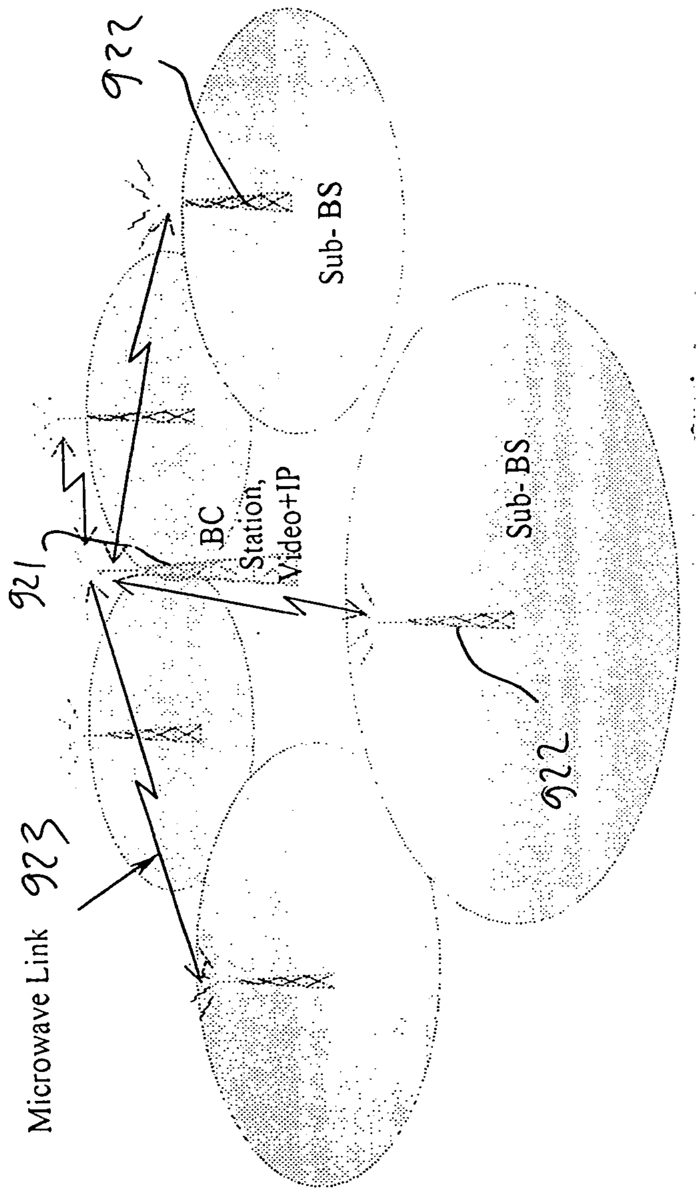


Fig. 36

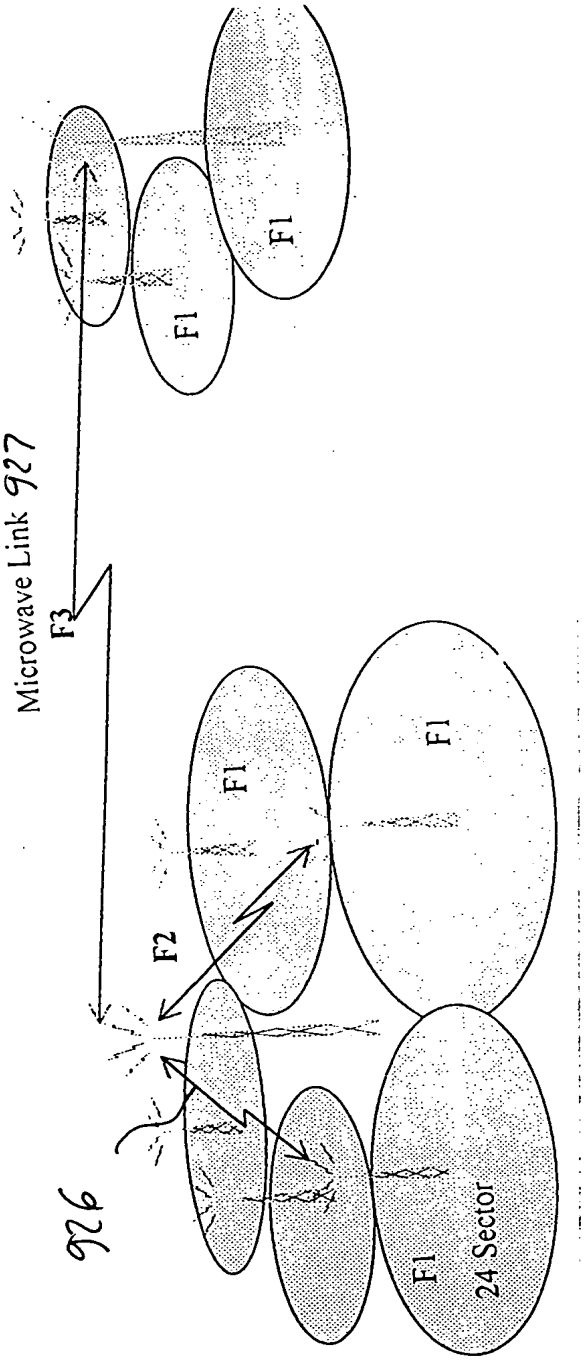


Fig. 37

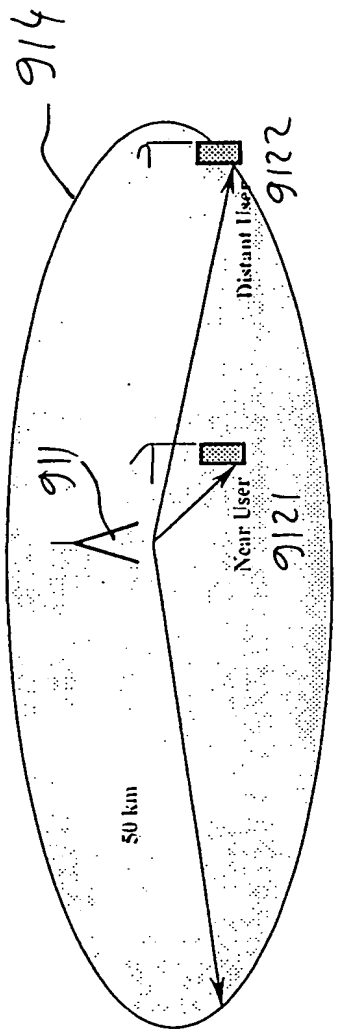


Fig. 38

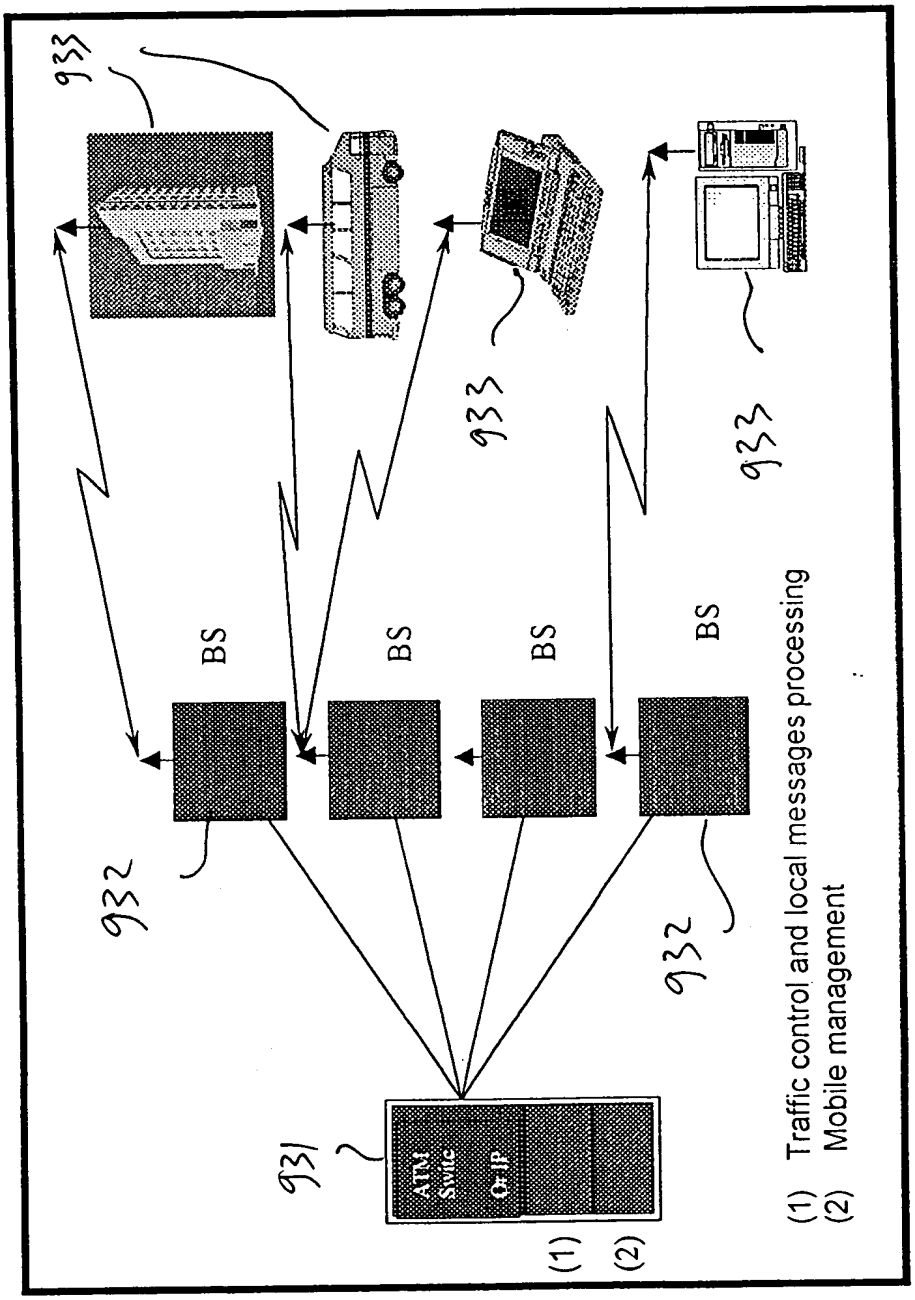

933
933
933
933
BS
BS
BS
BS
932
932
932
931
ATM Switc
IP
(1)
(2)
(1) Traffic control and local messages processing
(2) Mobile management

Fig. 39

08/25/2004 15:24:56

The Same Data for Mobile and Fixed Users

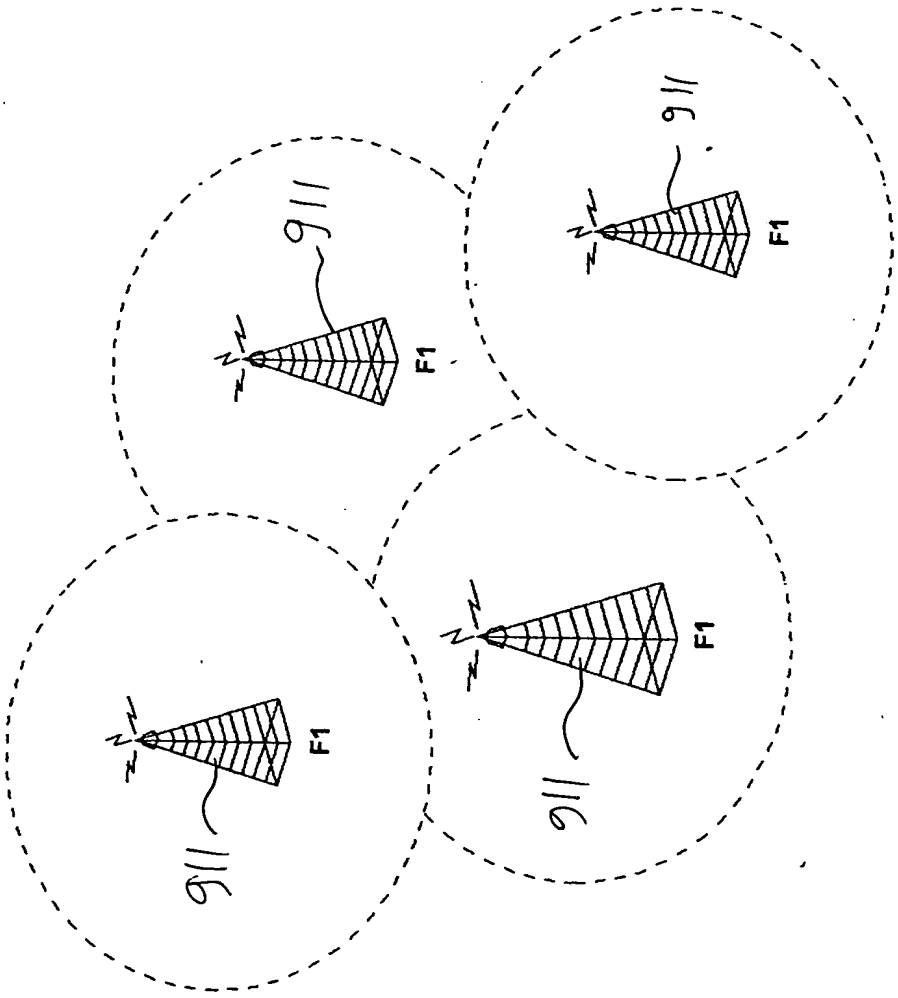


Fig. 40

The Same Data for Mobile and Fixed Users

Where There is a Problem of Coverage, Smaller Cells are Used

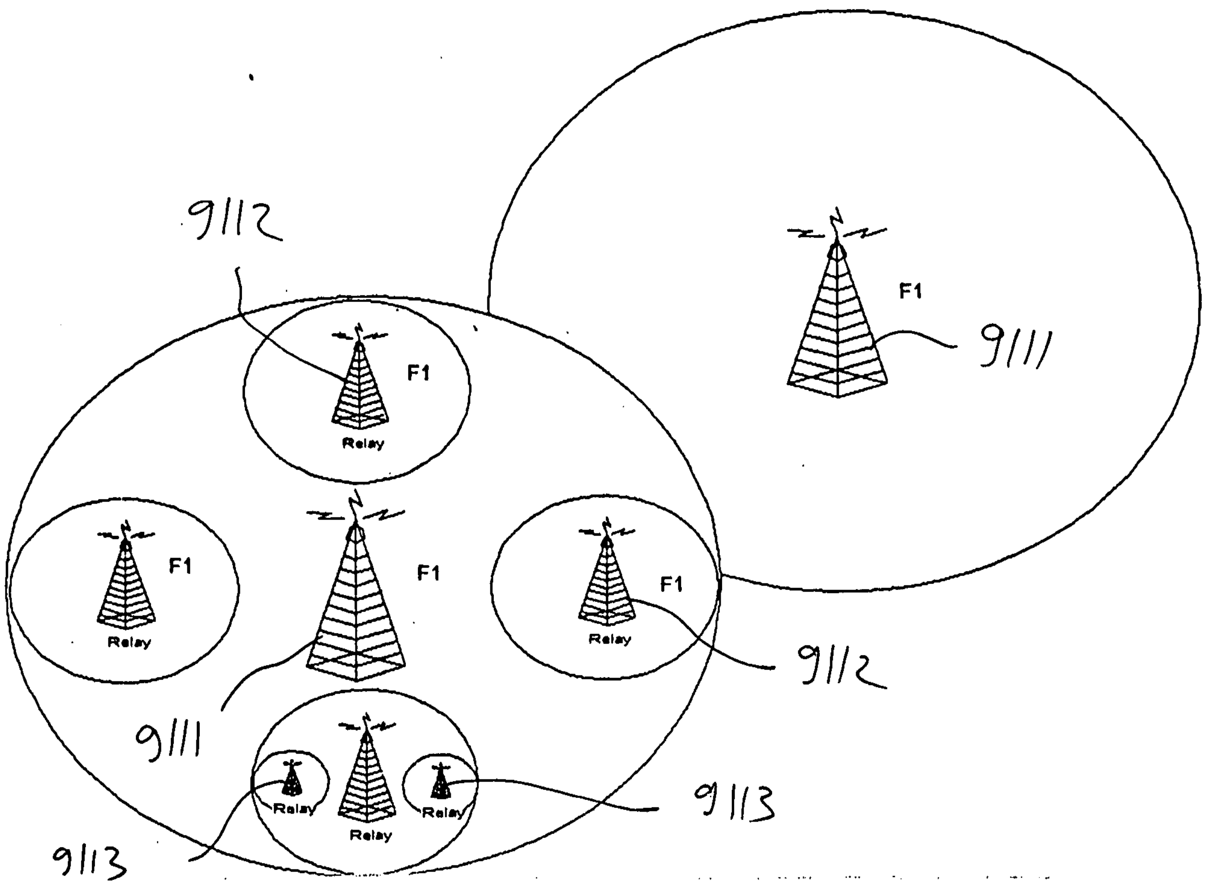


Fig. 41

- Each SFN Enables the Users to Receive Transmissions From Any B.S.
- Users Transmission can be Received by some B.S., While the main B.S. can use MRC.

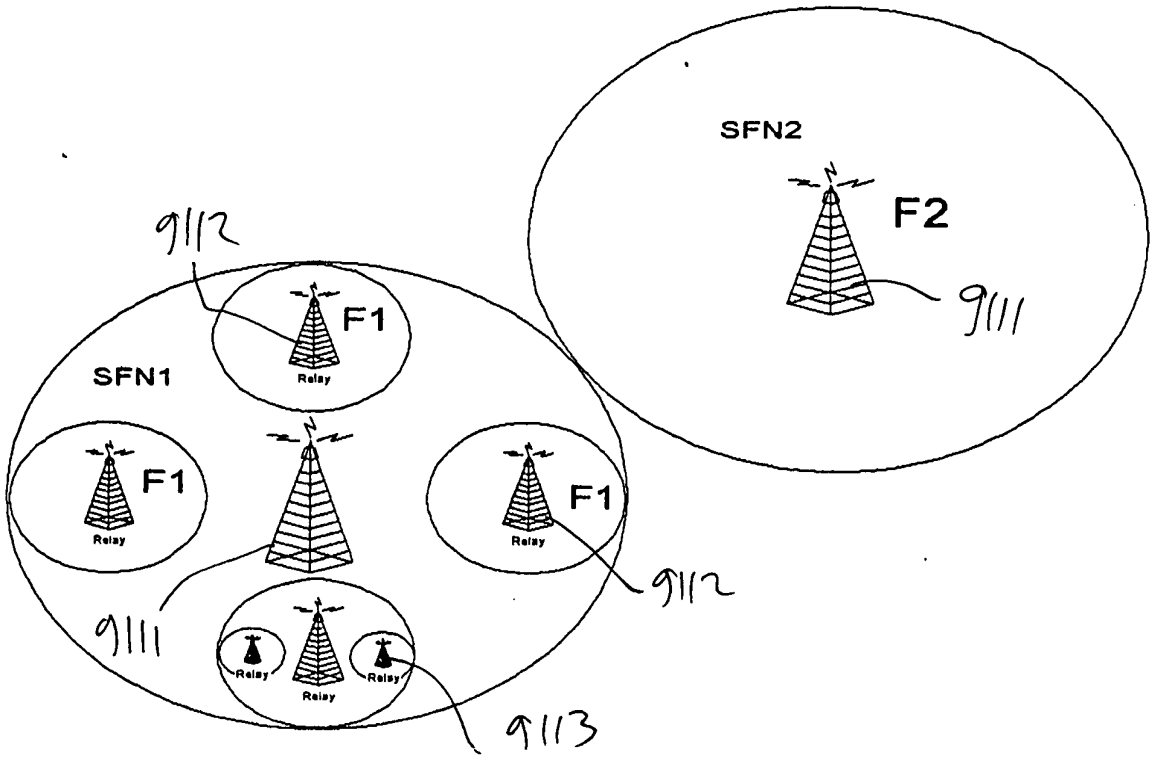


Fig. 42

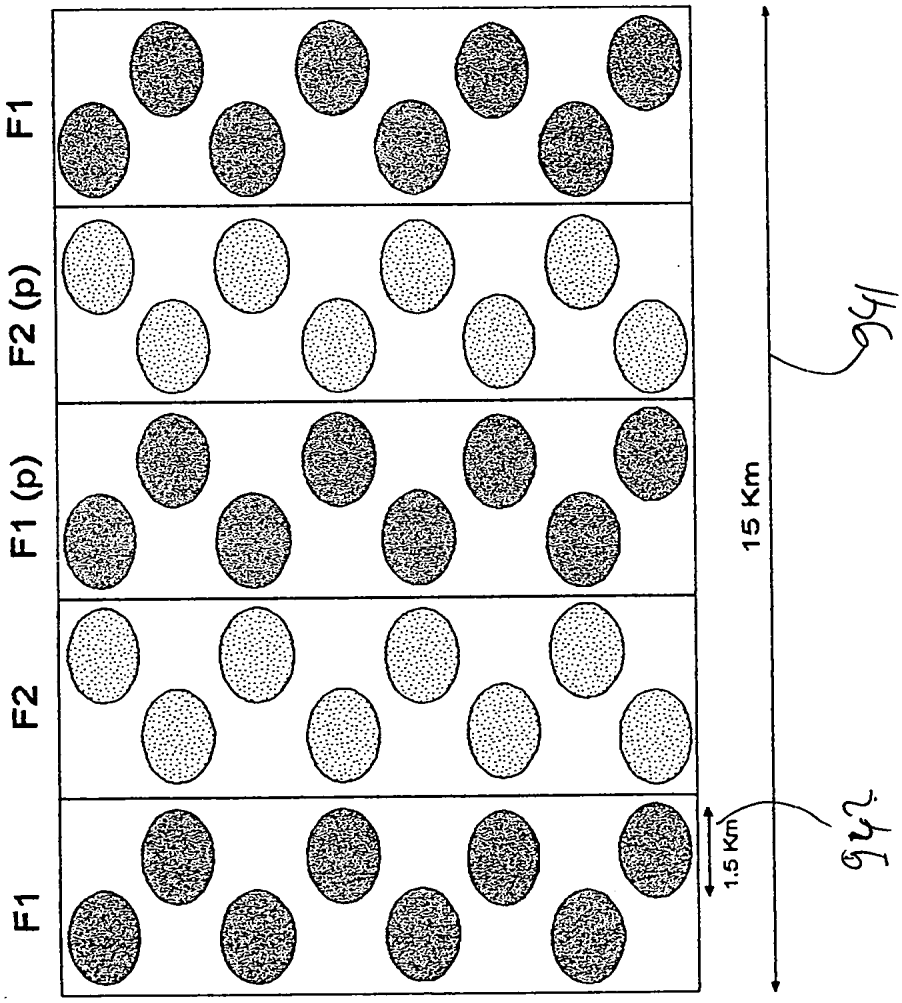


Fig. 43

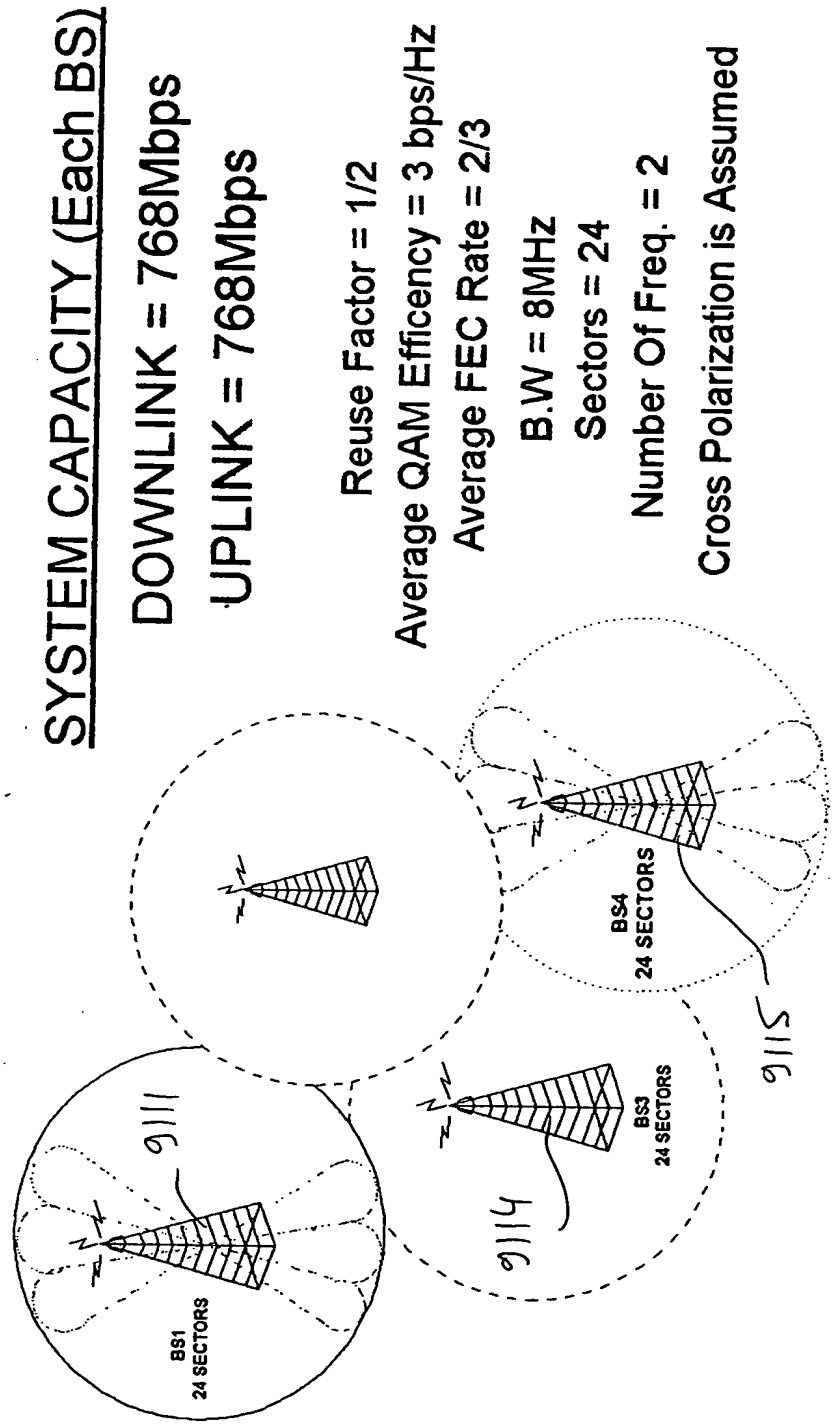

SYSTEM CAPACITY (Each BS)
DOWNLINK = 768Mbps
UPLINK = 768Mbps
Reuse Factor = 1/2
Average QAM Efficency = 3 bps/Hz
Average FEC Rate = 2/3
B.W = 8MHz
Sectors = 24
Number Of Freq. = 2
Cross Polarization is Assumed
BS1
24 SECTORS
BS3
24 SECTORS
BS4
24 SECTORS
9111
9114
9115

Fig. 44

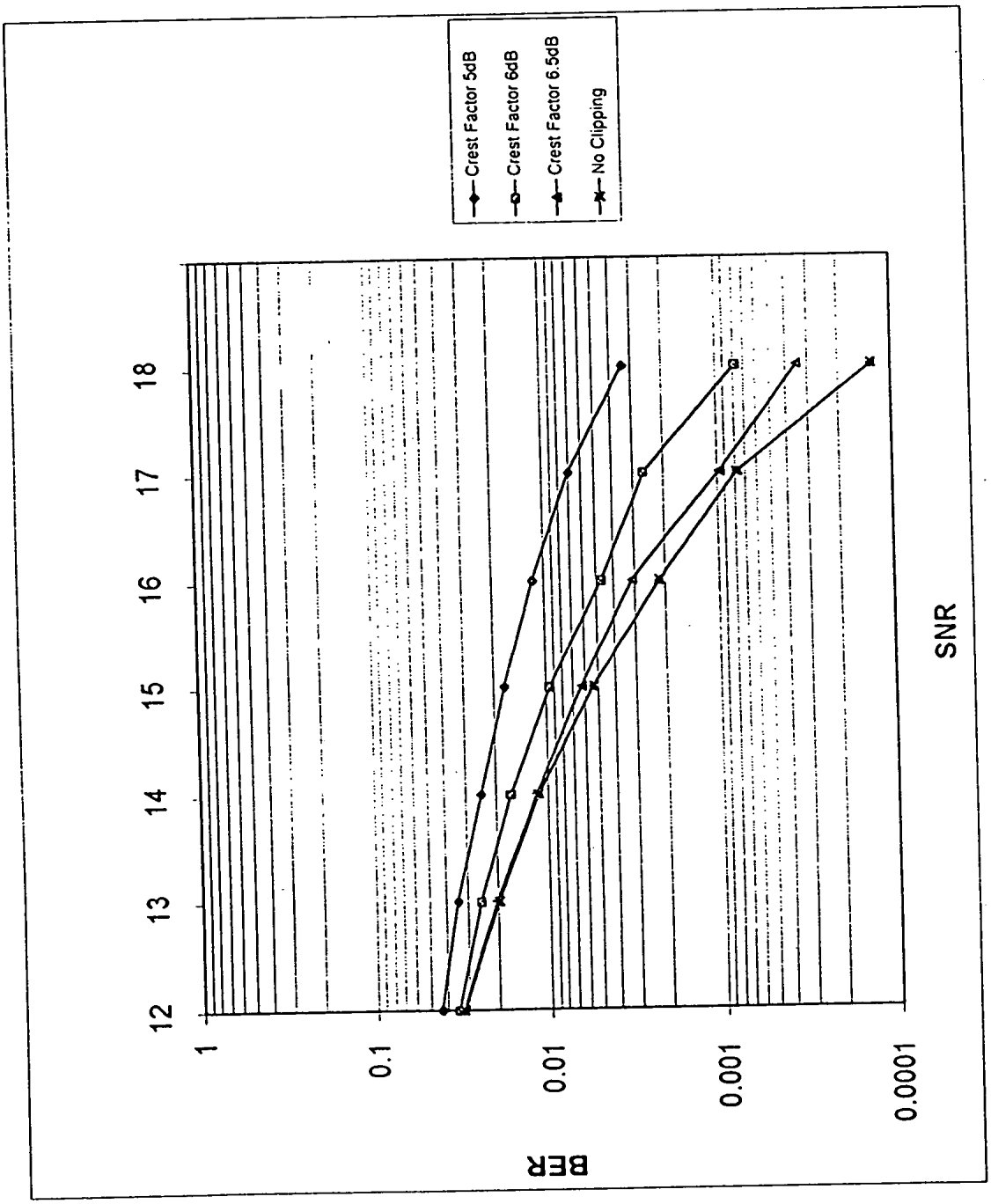


Fig. 45

09624237 - 07/24/09

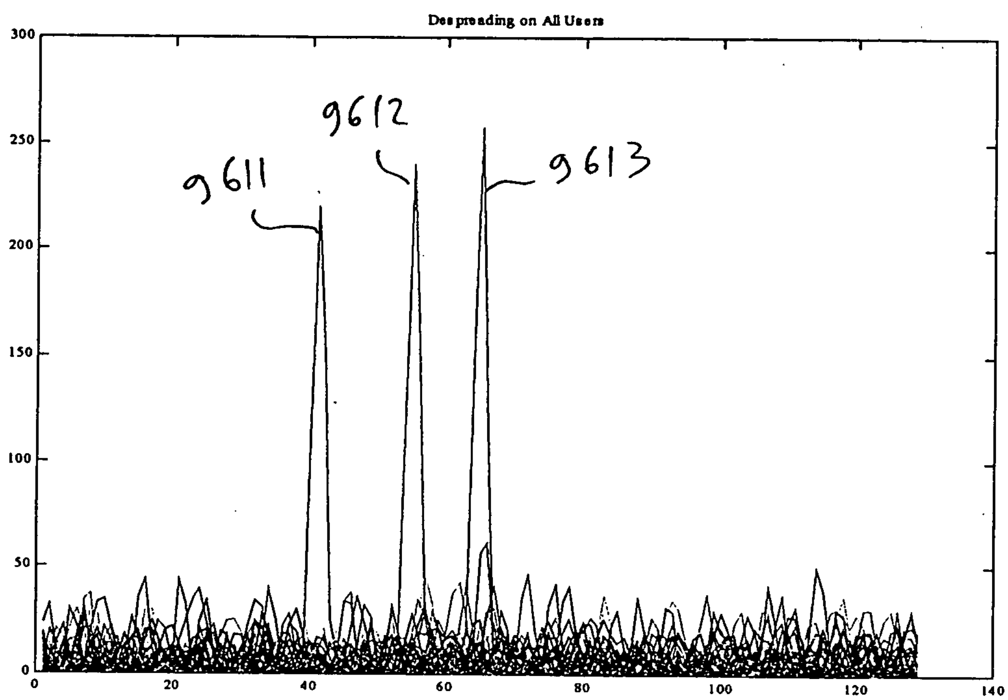


Fig. 46

09624237.072400

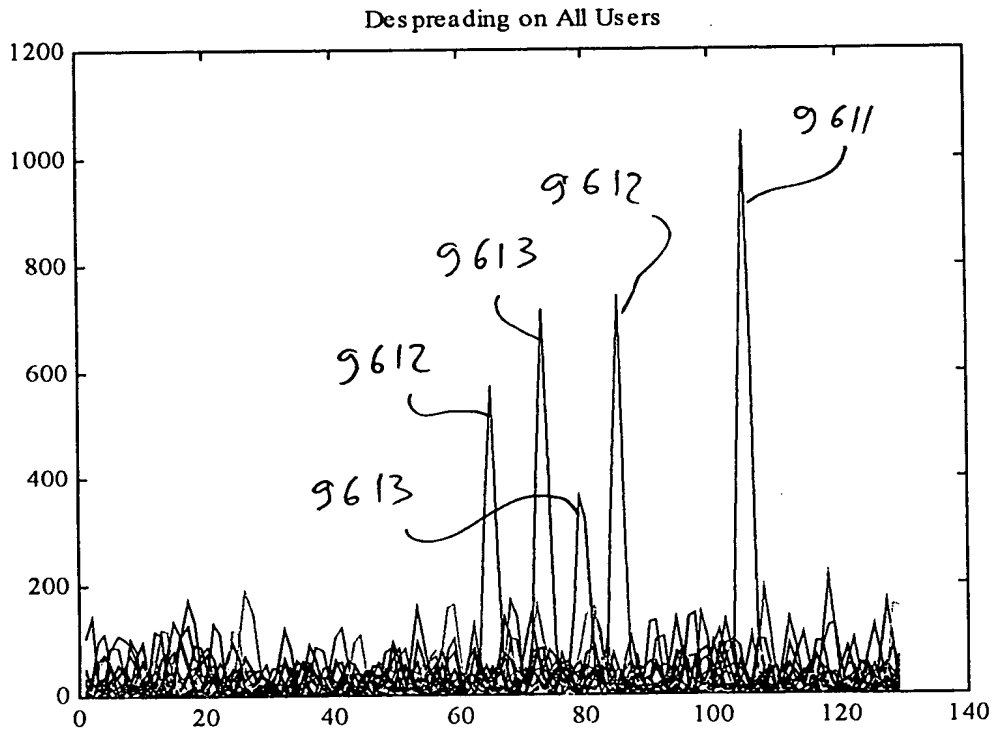

Despreading on All Users
1200
1000
800
600
400
200
0
0
20
40
60
80
100
120
140
9611
9612
9613
9612
9613

Fig. 47

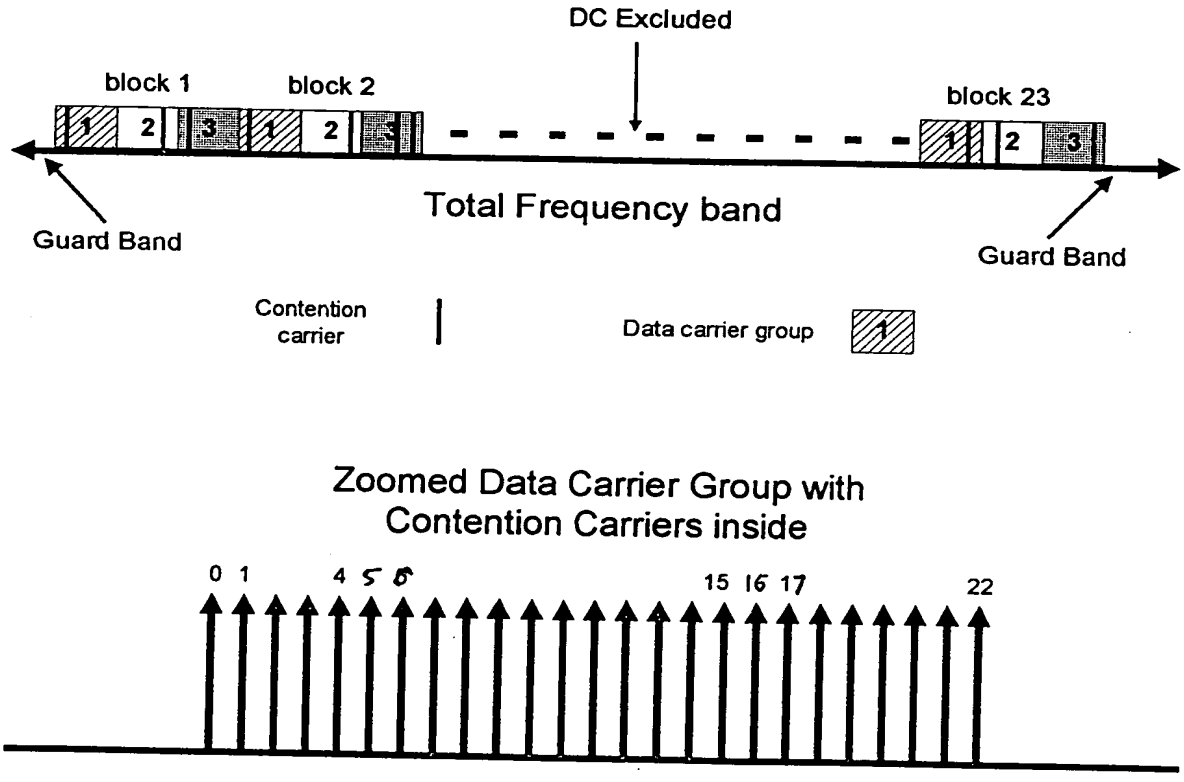

DC Excluded
block 1
block 2
block 23
1
2
3
1
2
3
1
2
3
Total Frequency band
Guard Band
Guard Band
Contention carrier
Data carrier group
1
Zoomed Data Carrier Group with Contention Carriers inside
0 1
4 5 6
15 16 17
22

Fig. 48